

# Article Title Goes Here

Author A. First<sup>1</sup> , Author A. Second<sup>1</sup> , Author A. Third<sup>2</sup> , Author Fourth<sup>2</sup> , Author A. Fifth<sup>1</sup> , and Author Sixth<sup>1,3</sup> 

## ABSTRACT

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

### KEY POINTS

- Key point one goes here.
- Key point two goes here.
- Key point three goes here.

### Supplemental Material

## A SECTION

Sed commodo posuere pede. Mauris ut est. Ut quis purus. Sed ac odio. Sed vehicula hendrerit sem. Duis non odio. Morbi ut dui. Sed accumsan risus eget odio. In hac habitasse platea dictumst. Pellentesque non elit. Fusce sed justo eu urna porta tincidunt. Mauris felis odio, sollicitudin sed, volutpat a, ornare ac, erat. Morbi quis dolor. Donec pellentesque, erat ac sagittis semper, nunc dui lobortis purus, quis congue purus metus ultricies tellus. Proin et quam. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Praesent sapien turpis, fermentum vel, eleifend faucibus, vehicula eu, lacus.

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Donec odio elit, dictum in, hendrerit sit amet, egestas sed, leo. Praesent feugiat sapien aliquet odio. Integer vitae justo. Aliquam vestibulum fringilla lorem. Sed neque lectus, consectetur at, consectetur sed, eleifend ac, lectus. Nulla facilisi. Pellentesque eget lectus. Proin eu metus. Sed porttitor. In hac habitasse platea dictumst. Suspendisse eu lectus. Ut mi mi, lacinia sit amet, placerat et, mollis vitae, dui. Sed ante tellus, tristique

ut, iaculis eu, malesuada ac, dui. Mauris nibh leo, facilisis non, adipiscing quis, ultrices a, dui.

Morbi luctus, wisi viverra faucibus pretium, nibh est placerat odio, nec commodo wisi enim eget quam. Quisque libero justo, consectetur a, feugiat vitae, porttitor eu, libero. Suspendisse sed mauris vitae elit sollicitudin malesuada. Maecenas ultricies eros sit amet ante. Ut venenatis velit. Maecenas sed mi eget dui varius euismod. Phasellus aliquet volutpat odio. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Pellentesque sit amet pede ac sem eleifend consectetur. Nullam elementum, urna vel imperdiet sodales, elit ipsum pharetra ligula, ac pretium ante justo a nulla. Curabitur tristique arcu eu metus. Vestibulum lectus. Proin mauris. Proin eu nunc eu urna hendrerit faucibus. Aliquam auctor, pede consequat laoreet varius, eros tellus scelerisque quam, pellentesque hendrerit ipsum dolor sed augue. Nulla nec lacus.

Suspendisse vitae elit. Aliquam arcu neque, ornare in, ullamcorper quis, commodo eu, libero. Fusce sagittis erat at erat tristique mollis. Maecenas sapien libero, molestie et, lobortis in, sodales eget, dui. Morbi ultrices rutrum lorem. Nam elementum ullamcorper leo. Morbi dui. Aliquam sagittis. Nunc placerat. Pellentesque tristique sodales est. Maecenas imperdiet lacinia velit. Cras non urna. Morbi eros pede, suscipit ac, varius vel, egestas non, eros. Praesent malesuada, diam id pretium elementum, eros sem dictum tortor, vel consectetur odio sem sed wisi.

Sed feugiat. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Ut pellentesque augue sed urna. Vestibulum diam eros, fringilla et, consectetur eu, nonummy id, sapien. Nullam at lectus. In sagittis ultrices mauris. Curabitur malesuada erat sit amet massa. Fusce blandit. Aliquam erat volutpat. Aliquam euismod. Aenean vel lectus. Nunc imperdiet justo nec dolor.

Etiam euismod. Fusce facilisis lacinia dui. Suspendisse potenti. In mi erat, cursus id, nonummy sed, ullamcorper eget, sapien. Praesent pretium, magna in eleifend egestas, pede pede pretium lorem, quis consectetur tortor sapien facilisis magna. Mauris quis magna varius nulla scelerisque imperdiet. Aliquam non quam. Aliquam porttitor quam a

1. First Affiliation, Institute, City, Country,  <https://orcid.org/0000-0000-0001> (AAF)  <https://orcid.org/0000-0000-0000-0002> (AAS)  <https://orcid.org/0000-0000-0000-0003> (AAT)  <https://orcid.org/0000-0000-0000-0004> (AF); 2. Second Affiliation, Institute, City, Country,  <https://orcid.org/0000-0000-0000-0005> (AAF)  <https://orcid.org/0000-0000-0000-0006> (AS); 3. Third Affiliation, Institute, City, Country

\*Corresponding author: auname@abc.org

Cite this article as First, A., A. Second, A. Third, A. Fourth, A. Fifth, A. Sixth, and A. Seventh (2022). Article Title Goes Here, *Bull. Seismol. Soc. Am.* **XX**, 1–49, doi: [00.0000/0000000000](https://doi.org/00.0000/0000000000).

© Seismological Society of America

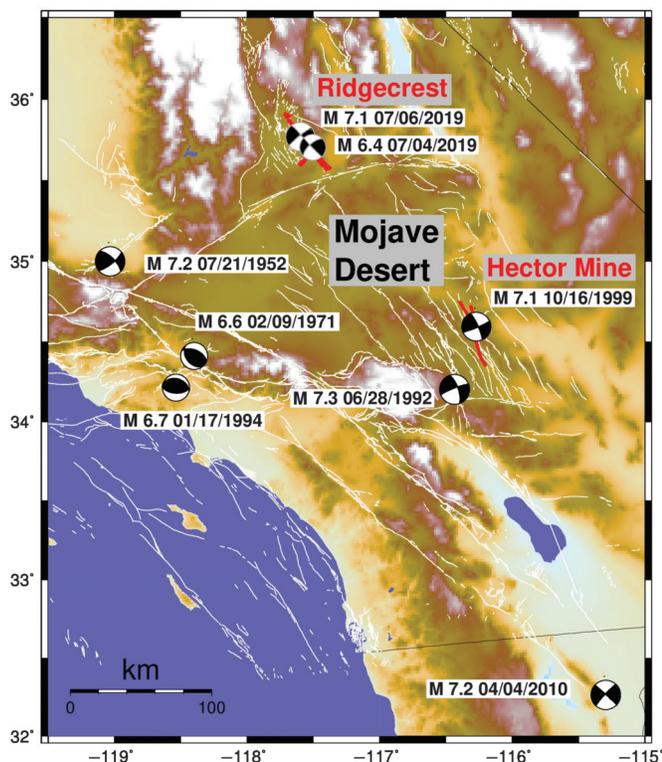


Figure 1. Figure caption goes here.

lacus. Praesent vel arcu ut tortor cursus volutpat. In vitae pede quis diam bibendum placerat. Fusce elementum convallis neque. Sed dolor orci, scelerisque ac, dapibus nec, ultricies ut, mi. Duis nec dui quis leo sagittis commodo.

Aliquam lectus. Vivamus leo. Quisque ornare tellus ullamcorper nulla. Mauris porttitor pharetra tortor. Sed fringilla justo sed mauris. Mauris tellus. Sed non leo. Nullam elementum, magna in cursus sodales, augue est scelerisque sapien, venenatis congue nulla arcu et pede. Ut suscipit enim vel sapien. Donec congue. Maecenas urna mi, suscipit in, placerat ut, vestibulum ut, massa. Fusce ultrices nulla et nisl.

Etiam ac leo a risus tristique nonummy. Donec dignissim tincidunt nulla. Vestibulum rhoncus molestie odio. Sed lobortis, justo et pretium lobortis, mauris turpis condimentum augue, nec ultricies nibh arcu pretium enim. Nunc purus neque, placerat id, imperdiet sed, pellentesque nec, nisl. Vestibulum imperdiet neque non sem accumsan laoreet. In hac habitasse platea dictumst. Etiam condimentum facilisis libero. Suspendisse in elit quis nisl aliquam dapibus. Pellentesque auctor sapien. Sed egestas sapien nec lectus. Pellentesque vel dui vel neque bibendum viverra. Aliquam porttitor nisl nec pede. Proin mattis libero vel turpis. Donec rutrum mauris et libero. Proin euismod porta felis. Nam lobortis, metus quis elementum commodo, nunc lectus elementum mauris, eget vulputate ligula tellus eu neque. Vivamus eu dolor.

Nulla in ipsum. Praesent eros nulla, congue vitae, euismod ut, commodo a, wisi. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Aenean nonummy magna non leo. Sed felis erat, ullamcorper in, dictum non, ultricies ut, lectus. Proin vel arcu a odio lobortis euismod. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Proin ut est. Aliquam odio. Pellentesque massa turpis, cursus eu, euismod nec, tempor congue, nulla. Duis viverra gravida mauris. Cras tincidunt. Curabitur eros ligula, varius ut, pulvinar in, cursus faucibus, augue.

Nulla mattis luctus nulla. Duis commodo velit at leo. Aliquam vulputate magna et leo. Nam vestibulum ullamcorper leo. Vestibulum condimentum rutrum mauris. Donec id mauris. Morbi molestie justo et pede. Vivamus eget turpis sed nisl cursus tempor. Curabitur mollis sapien condimentum nunc. In wisi nisl, malesuada at, dignissim sit amet, lobortis in, odio. Aenean consequat arcu a ante. Pellentesque porta elit sit amet orci. Etiam at turpis nec elit ultricies imperdiet. Nulla facilisi. In hac habitasse platea dictumst. Suspendisse viverra aliquam risus. Nullam pede justo, molestie nonummy, scelerisque eu, facilisis vel, arcu.

Curabitur tellus magna, porttitor a, commodo a, commodo in, tortor. Donec interdum. Praesent scelerisque. Maecenas posuere sodales odio. Vivamus metus lacus, varius quis, imperdiet quis, rhoncus a, turpis. Etiam ligula arcu, elementum a, venenatis quis, sollicitudin sed, metus. Donec nunc pede, tincidunt in, venenatis vitae, faucibus vel, nibh. Pellentesque wisi. Nullam malesuada. Morbi ut tellus ut pede tincidunt porta. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Etiam congue neque id dolor.

Donec et nisl at wisi luctus bibendum. Nam interdum tellus ac libero. Sed sem justo, laoreet vitae, fringilla at, adipiscing ut, nibh. Maecenas non sem quis tortor eleifend fermentum. Etiam id tortor ac mauris porta vulputate. Integer porta neque vitae massa. Maecenas tempus libero a libero posuere dictum. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Aenean quis mauris sed elit commodo placerat. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Vivamus rhoncus tincidunt libero. Etiam elementum pretium justo. Vivamus est. Morbi a tellus eget pede tristique commodo. Nulla nisl. Vestibulum sed nisl eu sapien cursus rutrum.

Nulla non mauris vitae wisi posuere convallis. Sed eu nulla nec eros scelerisque pharetra. Nullam varius. Etiam dignissim elementum metus. Vestibulum faucibus, metus sit amet mattis rhoncus, sapien dui laoreet odio, nec ultricies nibh augue a enim. Fusce in ligula. Quisque at magna et nulla commodo consequat. Proin accumsan imperdiet sem. Nunc porta. Donec feugiat mi at justo. Phasellus facilisis ipsum quis ante. In ac elit eget ipsum pharetra faucibus. Maecenas viverra nulla in massa.

Nulla ac nisl. Nullam urna nulla, ullamcorper in, interdum sit amet, gravida ut, risus. Aenean ac enim. In luctus. Phasellus eu quam vitae turpis viverra pellentesque. Duis feugiat felis ut enim. Phasellus pharetra, sem id porttitor sodales, magna nunc aliquet nibh, nec blandit nisl mauris at pede. Suspendisse risus risus, lobortis eget, semper at, imperdiet sit amet, quam. Quisque scelerisque dapibus nibh. Nam enim. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nunc ut metus. Ut metus justo, auctor at, ultrices eu, sagittis ut, purus. Aliquam aliquam.

## B Section

Etiam pede massa, dapibus vitae, rhoncus in, placerat posuere, odio. Vestibulum luctus commodo lacus. Morbi lacus dui, tempor sed, euismod eget, condimentum at, tortor. Phasellus aliquet odio ac lacus tempor faucibus. Praesent sed sem. Praesent iaculis. Cras rhoncus tellus sed justo ullamcorper sagittis. Donec quis orci. Sed ut tortor quis tellus euismod tincidunt. Suspendisse congue nisl eu elit. Aliquam tortor diam, tempus id, tristique eget, sodales vel, nulla. Praesent tellus mi, condimentum sed, viverra at, consectetur quis, lectus. In auctor vehicula orci. Sed pede sapien, euismod in, suscipit in, pharetra placerat, metus. Vivamus commodo dui non odio. Donec et felis.

$$u_{\text{mod}}(t) = a_1^{\text{foreshock}} H(t - t_{\text{foreshock}}) + a_1^{\text{mainshock}} H(t - t_0) + a_2 + a_3(t - t_0) + a_4 \cos(2\pi t) + a_5 \sin(2\pi t) + a_6 \cos(4\pi t) + a_7 \sin(4\pi t) + u_{\text{post}}(t) \quad (1)$$

Etiam suscipit aliquam arcu. Aliquam sit amet est ac purus bibendum congue. Sed in eros. Morbi non orci. Pellentesque mattis lacinia elit. Fusce molestie velit in ligula. Nullam et orci vitae nibh vulputate auctor. Aliquam eget purus. Nulla auctor wisi sed ipsum. Morbi porttitor tellus ac enim. Fusce ornare. Proin ipsum enim, tincidunt in, ornare venenatis, molestie a, augue. Donec vel pede in lacus sagittis porta. Sed hendrerit ipsum quis nisl. Suspendisse quis massa ac nibh pretium cursus. Sed sodales. Nam eu neque quis pede dignissim ornare. Maecenas eu purus ac urna tincidunt congue.

Donec et nisl id sapien blandit mattis. Aenean dictum odio sit amet risus. Morbi purus. Nulla a est sit amet purus venenatis iaculis. Vivamus viverra purus vel magna. Donec in justo sed odio malesuada dapibus. Nunc ultrices aliquam nunc. Vivamus facilisis pellentesque velit. Nulla nunc velit, vulputate dapibus, vulputate id, mattis ac, justo. Nam mattis elit dapibus purus. Quisque enim risus, congue non, elementum ut, mattis quis, sem. Quisque elit.

Maecenas non massa. Vestibulum pharetra nulla at lorem. Duis quis quam id lacus dapibus interdum. Nulla lorem. Donec ut ante quis dolor bibendum condimentum. Etiam egestas tortor vitae lacus. Praesent cursus. Mauris bibendum pede at elit. Morbi et felis a lectus interdum facilisis.

Sed suscipit gravida turpis. Nulla at lectus. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Praesent nonummy luctus nibh. Proin turpis nunc, congue eu, egestas ut, fringilla at, tellus. In hac habitasse platea dictumst.

Vivamus eu tellus sed tellus consequat suscipit. Nam orci orci, malesuada id, gravida nec, ultricies vitae, erat. Donec risus turpis, luctus sit amet, interdum quis, porta sed, ipsum. Suspendisse condimentum, tortor at egestas posuere, neque metus tempor orci, et tincidunt urna nunc a purus. Sed facilisis blandit tellus. Nunc risus sem, suscipit nec, eleifend quis, cursus quis, libero. Curabitur et dolor. Sed vitae sem. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Maecenas ante. Duis ullamcorper enim. Donec tristique enim eu leo. Nullam molestie elit eu dolor. Nullam bibendum, turpis vitae tristique gravida, quam sapien tempor lectus, quis pretium tellus purus ac quam. Nulla facilisi.

Duis aliquet dui in est. Donec eget est. Nunc lectus odio, varius at, fermentum in, accumsan non, enim. Aliquam erat volutpat. Proin sit amet nulla ut eros consectetur cursus. Phasellus dapibus aliquam justo. Nunc laoreet. Donec consequat placerat magna. Duis pretium tincidunt justo. Sed sollicitudin vestibulum quam. Nam quis ligula. Vivamus at metus. Etiam imperdiet imperdiet pede. Aenean turpis. Fusce augue velit, scelerisque sollicitudin, dictum vitae, tempor et, pede. Donec wisi sapien, feugiat in, fermentum ut, sollicitudin adipiscing, metus.

## C Section

Donec vel nibh ut felis consectetur laoreet. Donec pede. Sed id quam id wisi laoreet suscipit. Nulla lectus dolor, aliquam ac, fringilla eget, mollis ut, orci. In pellentesque justo in ligula. Maecenas turpis. Donec eleifend leo at felis tincidunt consequat. Aenean turpis metus, malesuada sed, condimentum sit amet, auctor a, wisi. Pellentesque sapien elit, bibendum ac, posuere et, congue eu, felis. Vestibulum mattis libero quis metus scelerisque ultrices. Sed purus.

Donec molestie, magna ut luctus ultrices, tellus arcu nonummy velit, sit amet pulvinar elit justo et mauris. In pede. Maecenas euismod elit eu erat. Aliquam augue wisi, facilisis congue, suscipit in, adipiscing et, ante. In justo. Cras lobortis neque ac ipsum. Nunc fermentum massa at ante. Donec orci tortor, egestas sit amet, ultrices eget, venenatis eget, mi. Maecenas vehicula leo semper est. Mauris vel metus. Aliquam erat volutpat. In rhoncus sapien ac tellus. Pellentesque ligula.

Cras dapibus, augue quis scelerisque ultricies, felis dolor placerat sem, id porta velit odio eu elit. Aenean interdum nibh sed wisi. Praesent sollicitudin vulputate dui. Praesent iaculis viverra augue. Quisque in libero. Aenean gravida lorem vitae sem ullamcorper cursus. Nunc adipiscing rutrum ante. Nunc ipsum massa, faucibus sit amet,

viverra vel, elementum semper, orci. Cras eros sem, vulpitate et, tincidunt id, ultrices eget, magna. Nulla varius ornare odio. Donec accumsan mauris sit amet augue. Sed ligula lacus, laoreet non, aliquam sit amet, iaculis tempor, lorem. Suspendisse eros. Nam porta, leo sed congue tempor, felis est ultrices eros, id mattis velit felis non metus. Curabitur vitae elit non mauris varius pretium. Aenean lacus sem, tincidunt ut, consequat quis, porta vitae, turpis. Nullam laoreet fermentum urna. Proin iaculis lectus.

(Abramowitz and Stegun, 1972) (Adiyaman et al., 2001) (Afanasiev et al., 2014) (Afanasiev et al., 2016) (Afanasiev et al., 2019) (Afonso et al., 2013) (Adams and Swartztrauber, 1997) (Adams et al., 2005) (Agliz and Atmani, 2013) (Agrawal, 2012) (Ahmad and Razzaghi, 1998) (Ajo-Franklin et al., 2019) (Aki, 1957) (Aki and Lee, 1976) (Aki et al., 1976) (Aki and Patton, 1978) (Aki, 1980a) (Aki, 1980b) (Aki, 1981) (Aki and Richards, 1980) (Aki and Richards, 2002) (Alberts et al., 2002) (Alkhalifah, 2000) (Almomin and Biondi, 2012) (Alt, 2002) (Alterman and Karal, 1968) (Alterman et al., 1970) (Amante and Eakins, 2009) (Aminzadeh et al., 2013) (Ammon et al., 1990) (Ammon et al., 2011) (An, 2012) (Anderson et al., 1968) (Anderson and Minster, 1979) (Anderson, 1998) (Anderson, 2005) (Anderssen and Seneta, 1971) (Aoki and Schuster, 2009) (Archuleta, 1984) (Ardhuin et al., 2011) (Ardhuin et al., 2015) (Ardhuin et al., 2019) (Arnoldi, 1951) (Avron and Toledo, 2011) (Babuška and Cara, 1991) (Babuška and Dorr, 1981) (Babusška et al., 1981) (Backus and Gilbert, 1961) (Backus, 1962) (Backer, 1976) (Backus and Gilbert, 1967) (Backus and Gilbert, 1968) (Backus and Gilbert, 1970) (Backus and Mulcahy, 1976a) (Backus and Mulcahy, 1976b) (Baig and Dahlen, 2004) (Baig et al., 2009) (Bakulin and Calvert, 2004) (Bakulin and Calvert, 2006) (Ballmer et al., 2015) (Bao et al., 1998) (Bao et al., 2012) (Barka, 1992) (Barnes and Charara, 2008) (Bartlett, 1946) (Bartlett, 1951) (Båth, 1968) (Bakırcı et al., 2012) (Bamberger et al., 1977) (Bamberger et al., 1979) (Bamberger et al., 1982) (Bardenet et al., 2014) (Bassin et al., 2000) (Basini et al., 2013) (Bastow et al., 2010) (Bayes and Price, 1763) (Bazaraa and Shetty, 1976) (Becker and Boschi, 2002) (Becker et al., 2006) (Becker, 2008) (Behn et al., 2009) (Bekas et al., 2007) (Ben Belgacem, 1993) (Ben Belgacem, 1999) (Ben Belgacem and Maday, 1994) (Ben Hadj Ali et al., 2009b) (Ben Hadj Ali et al., 2009a) (Bendinelli et al., 1987) (Bensen et al., 2007) (Ben-Zion, 2008) (Bercovici and Karato, 2003) (Bernardi et al., 2004) (Bernardi and Maday, 1992) (Bernardi et al., 1994) (Bernauer et al., 2009) (Bernauer et al., 2012) (Bernauer et al., 2014a) (Bernauer et al., 2014b) (Bertholds and Dändliker, 1988) (Beskos et al., 2013) (Betancourt et al., 2015) (Betancourt, 2017) (Bethier et al., 2006) (Beyreuther et al., 2010) (Barry et al., 1988) (Bijwaard et al., 1998) (Biondi and Almomin, 2014) (Biondi et al., 2017) (Bird, 2003) (Biryol et al., 2011) (Bishop, 2006) (Biswas and Sen, 2017) (Blackman and Kendall, 1997)

(Blakely, 1996) (Blanch et al., 1995) (Blanes et al., 2014) (Bleibinhaus et al., 2007) (Bleibinhaus et al., 2009) (Blom et al., 2017) (Bodin and Sambridge, 2009) (Bodin et al., 2012) (Bodin et al., 2015) (Boehm et al., 2016) (Boehm and Fichtner, 2018) (Boehm et al., 2018) (Bogey and Bailly, 2004) (Bogris et al., 2021) (Bohlen, 2002) (Bonnefoy-Claudet et al., 2006) (Boore, 1970) (Boschi and Dziewoński, 2000) (Boschi, 2003) (Boschi et al., 2004) (Boschi et al., 2013) (Boschi et al., 2019) (Bouchon, 1979) (Boué et al., 2013) (Bourguignon et al., 2006) (Bowden and Tsai, 2015) (Bowden et al., 2016) (Bowden et al., 2017) (Bowden et al., 2020) (Bozdağ and Trampert, 2008) (Bozdağ et al., 2011) (Bozdağ et al., 2016) (Bozkurt, 2001) (Brenders and Pratt, 2007) (Bréger and Romanowicz, 1998) (Bréger et al., 1998) (Brenquier et al., 2008) (Brenquier et al., 2008) (Brewster and Beylkin, 1995) (Briand et al., 2013) (Brocher, 2005) (Bromirski et al., 2017) (Broodlie et al., 1973) (Brossier et al., 2009b) (Brossier et al., 2009a) (Brossier et al., 2010) (Broyden, 1970) (Bube and Burridge, 1983) (Bucher and Misra, 2002) (Bullen, 1963) (Bunge et al., 2003) (Bui-Thanh et al., 2013) (Bui-Thanh and Ghattas, 2012) (Buland and Gilbert, 1976) (Bunks et al., 1995) (Burridge and Knopoff, 1964) (Burridge, 1980) (Buselmaier and Haussig, 2018) (Bussat and Kugler, 2011) (Butter and Hocker, 1978) (Calderhead and Sustik, 2012) (Cammarano et al., 2003) (Campbell and Kerr, 2007) (Campillo and Paul, 2003) (Cance and Capdeville, 2015) (Capdeville et al., 1997) (Capdeville et al., 2000) (Capdeville, 2000) (Capdeville, 2010) (Capdeville et al., 2003) (Capdeville et al., 2002) (Capdeville et al., 2002) (Capdeville et al., 2003) (Capdeville, 2005) (Capdeville et al., 2005) (Capdeville and Marigo, 2007) (Capdeville and Marigo, 2008) (Capdeville et al., 2010a) (Capdeville et al., 2010b) (Capdeville et al., 2013a) (Capdeville and Marigo, 2013) (Capdeville et al., 2013b) (Capdeville and Métivier, 2018) (Capdeville et al., 2020) (Carcione et al., 1988a) (Carcione et al., 1988b) (Carcione, 1992) (Cerjan et al., 1985) (Cerveny, 2001) (Cesca et al., 2010) (Chang et al., 2010) (Charlier, 1905) (Chastel and Dawson, 1993) (Chevalier and Pellegrini, 2008) (Chib and Greenberg, 1995) (Chib et al., 1998) (Chou and Booker, 1979) (Cheng and Kennett, 2002) (Cole, 1995) (Cormack, 1963) (Crase et al., 1990) (Canas and Mitchell, 1978) (Capdeville et al., 1999) (Cara et al., 1984) (Carcione and Wang, 1993) (Cazenave et al., 1989) (Chaljub and Tarantola, 1997) (Chaljub et al., 2003) (Chaljub, 2000) (Chapman, 1978) (Chapman and Leaney, 2012) (Chavent et al., 1975) (Chavent and Plessix, 1999) (Chevrot et al., 1998b) (Chevrot et al., 1998a) (Chevrot and Zhao, 2007) (Chen et al., 2007) (Chen et al., 2007) (Chen, 2011) (Chen et al., 2015) (Chew and Lin, 1995) (Christensen and Mooney, 1995) (Chouet, 1996) (Chulliat et al., 2017) (Claerbout, 1968) (Chaljub et al., 2001) (Clayton and Engquist, 1977) (Clayton, 2015) (Cleary, 1974) (Clévéde, 1991) (Clévéde et al., 2000) (Clévéde and Logonnné, 1996) (Cobden et al., 2010) (Colli et al., 2013)

(Colli et al., 2017) (Connolly, 2005) (Cohen-Tannoudji et al., 1977) (Cotton and Campillo, 1995) (Courtillot et al., 2003) (Cowles and Carlin, 1996) (Cramér, 1957) (Crampin and Chastin, 2003) (Crank and Nicolson, 1947) (Crary, 1954) (Creager, 1992) (Creager, 1997) (Creutz, 1988) (Crotwell et al., 1999) (Çubuk Sabuncu et al., 2017) (Cummins, 1992) (Cummins et al., 1994) (Cummins et al., 1994) (Cummins et al., 1997) (Cupillard et al., 2012) (Cupillard, 2008) (Cupillard and Capdeville, 2010) (Cupillard et al., 2011) (Cupillard and Capdeville, 2018) (Currenti et al., 2008) (Currenti et al., 2021) (Curry, 2008) (Curtis, 1999b) (Curtis, 1999a) (Curtis and Maurer, 2000) (Curtis and Halliday, 2010) (Dablain, 1986) (Dahlen, 1968) (Dahlen, 1969) (Dahlen, 1972) (Dahlen, 1973) (Dahlen, 1987) (Dahlen and Tromp, 1998) (Dahlen et al., 2000) (Dahlen and Baig, 2002) (Dahlin et al., 2015) (Dal Moro and Pipan, 2006) (Dalton et al., 2008) (Danecek et al., 2011) (Daskalakis et al., 2016) (Datta et al., 2019) (Davies, 1999) (Deal and Nolet, 1996) (Dean et al., 1996) (Debayle and Kennett, 2000) (Debayle and Sambridge, 2004) (Debayle and Ricard, 2013) (Debayle et al., 2016) (de Kool et al., 2006) (De Martino et al., 2005) (Delaney et al., 2017) (Daley et al., 2016) (Daley et al., 2013) (Daley et al., 2014) (Del Brio et al., 2009) (DeMets et al., 1994) (de la Puente et al., 2007) (Denolle et al., 2013) (Denolle et al., 2014) (de Ridder et al., 2014) (de Ridder and Biondi, 2015) (Deschamps et al., 2012) (Dessa and Pascal, 2003) (Dessa et al., 2004) (Deuss and Woodhouse, 2001) (Deuss, 2008) (Devaney, 1984) (Devilee et al., 1999) (de Vogelaere, 1956) (de Vos et al., 2013) (de Wit et al., 2012) (de Wit et al., 2013) (Díaz et al., 2009) (Díaz and Guitton, Díaz and Guitton) (Ding and Helmberger, 1997) (Dondi et al., 1981) (Donner et al., 2016) (Dorobantu and Engquist, 1998) (Drewry et al., 1982) (Drineas et al., 2006) (Drugan and Willis, 1995) (Duane et al., 1987) (Dufumier and Rivera, 1997) (Dubbledam et al., 2016) (Dumbser et al., 2007) (Dumbser et al., 2007) (Dupond, 1973) (Duputel et al., 2009) (Durand et al., 2011) (Durek and Ekström, 1996) (Duvall et al., 2006) (Dworetzky, 1983) (Dziewoński, 1995) (Dziewoński and Gilbert, 1974) (Dziewoński et al., 1975) (Dziewoński et al., 1977) (Dziewoński and Anderson, 1981) (Dziewoński et al., 1981) (Dziewoński and Woodhouse, 1981) (Ernst et al., 2007) (Edmonds, 1960) (Ekström and Dziewoński, 1998) (Elhathisari et al., 2015) (Ekström et al., 2012) (El Moudnib et al., 2015) (Egeran and Lahn, 1944) (Emmerich and Korn, 1987) (Endrun et al., 2008) (Engquist and Runborg, 2002) (Engquist and Ying, 2011a) (Engquist and Ying, 2011b) (Epanomeritakis et al., 2008) (Ermert et al., 2016) (Ermert et al., 2017) (Ewing et al., 1957) (Faccenna et al., 2010) (Faccioli et al., 1996) (Faccioli et al., 1997) (Fang, 1990) (Fang et al., 2010) (Farnetani and Richards, 1995) (Farra et al., 2016) (Farnetani, 1997) (Ferreira and Igel, 2009) (Ferreira et al., 2010) (Fichtner et al., 2006a) (Fichtner et al., 2006b) (Fichtner and Igel, 2008) (Fichtner et al., 2008) (Fichtner et al., 2009a) (Fichtner et al., 2009b) (Fichtner and Igel, 2009) (Fichtner and Tkalcic, 2010) (Fichtner et al., 2010) (Fichtner et al., 2010) (Fichtner, 2010) (Fichtner and Trampert, 2011a) (Fichtner and Trampert, 2011b) (Fichtner et al., 2012) (Fichtner et al., 2013) (Fichtner et al., 2013) (Fichtner et al., 2013) (Fichtner, 2014) (Fichtner and van Driel, 2014) (Fichtner and Villaseñor, 2015) (Fichtner and van Leeuwen, 2015) (Fichtner, 2015) (Fichtner et al., 2017) (Fichtner et al., 2017) (Fichtner and Hanasoge, 2017) (Fichtner et al., 2018) (Fichtner and Simute, 2018) (Fichtner et al., 2019) (Fichtner et al., 2018) (Fichtner and Tsai, 2019) (Fichtner and Zunino, 2019) (Fichtner et al., 2020) (Fichtner et al., 2021) (Fichtner, 2021) (Finlayson, 1972) (Fishwick et al., 2005) (Fish et al., 2002) (Fishwick et al., 2008) (Flanagan and Wiens, 1998) (Fletcher and Reeves, 1964) (Fletcher, 1970) (Fletcher et al., 2008) (Fleury et al., 2010) (Fomel, 2002) (Fontaine et al., 2009) (Forghani and Snieder, 2010) (Fornberg, 1988) (Fornberg, 1995) (Foulger, 2007) (Fox and Nicholls, 1997) (Frankel and Clayton, 1986) (Frankel, 1989) (French et al., 2013) (French and Romanowicz, 2014) (Fretwell, P. and Pritchard, H. D. and Vaughan, D. G. and Bamber, J. L. and Barrand, N. E. and Bell, R. and Bianchi, C. and Bingham, R. G. and Blankenship, D. D. and Casassa, G. and Catania, G. and Callens, D. and Conway, H. and Cook, A. J. and Corr, H. F. J. and Damaske, D. and Damm, V. and Ferraccioli, F. and Forsberg, R. and Fujita, S. and Gim, Y. and Gogineni, P. and Griggs, J. A. and Hindmarsh, R. C. A. and Holmlund, P. and Holt, J. W. and Jacobel, R. W. and Jenkins, A. and Jokat, W. and Jordan, T. and King, E. C. and Kohler, J. and Krabill, W. and Riger-Kusk, M. and Langley, K. A. and Leitchenkov, G. and Leuschen, C. and Luyendyk, B. P. and Matsuoka, K. and Mouginit, J. and Nitsche, F. O. and Nogi, Y. and Nost, O. A. and Popov, S. V. and Rignot, E. and Rippin, D. M. and Rivera, A. and Roberts, J. and Ross, N. and Siegert, M. J. and Smith, A. M. and Steinhage, D. and Studinger, M. and Sun, B. and Tinto, B. K. and Welch, B. C. and Wilson, D. and Young, D. A. and Xiangbin, C. and Zirizzotti, A., 2013) (Friederich, 1999) (Friederich and Dalkolmo, 1995) (Friederich et al., 1993) (Friederich, 2003) (Frieze et al., 2004) (Froment et al., 2010) (Fu et al., 2016) (Fukuyama et al., 1998) (Furumura and Takenaka, 1996) (Furumura et al., 1998) (Furumura et al., 1998) (Furumura et al., 1999) (Furumura and Kennett, 2005) (Fuchs and Müller, 1971) (Fuchs, 1977) (Gaite et al., 2015) (Gal and Reading, 2019) (Gallagher et al., 1991) (Gallovic et al., 2015) (Gao et al., 2006) (Garcia and Souriau, 2000) (Gardner et al., 1974) (Garnero and Helmberger, 1995a) (Garnero and Lay, 1997) (Garnero and Helmberger, 1995b) (Garnero and Helmberger, 1996) (Garnero and Helmberger, 1998) (Garnero and Vidale, 1999) (Garnero, 2000) (Gauss, 1809) (Gauthier et al., 1986) (Gazdag, 1981) (Gebrad et al., 2020) (Gee and Jordan, 1992) (Geller and Ohminato, 1994) (Geller and Takeuchi, 1995a) (Geller and

Stein, 1978) (Geller et al., 1985) (Geller and Takeuchi, 1995b) (Gelman and Rubin, 1992) (Gelman et al., 2013) (Geweke, 1992) (Geweke and Tanizaki, 1999) (Geyer, 1992) (Geyer and Thompson, 1995) (Geyer, 2011) (Giardini et al., 1987) (Gilbert, 1980) (Gilliland, 1981) (Gilbert and Dziewoński, 1975) (Gilbert, 1971) (Gilbert, 1973) (Gimbert and Tsai, 2016) (Girolami and Calderhead, 2011) (Givoli and Keller, 1990) (Gizon and Birch, 2002) (Glatzmaier and Roberts, 1995) (Wunderman, 2011) (Global Volcanism Program, 2012) (Global Volcanism Program, 2021) (Godin, 2009) (Goetze, 1971) (Goetze and Brace, 1972) (Gokhberg and Fichtner, 2016) (Goldfarb, 1970) (Gorbatov and Kennett, 2003) (Gram, 1883) (Grand et al., 1997) (Grant, 1973) (Graves, 1996) (Graves and Wald, 2001) (Graves et al., 2010) (Green, 1995) (Green and Hastie, 2009) (Griewank and Walther, 2000) (Griffiths and Campell, 1990) (Groos et al., 2012) (Grote and Keller, 1995) (Gu et al., 2001) (Gualtieri et al., 2013) (Gualtieri et al., 2019) (Guasch et al., 2020) (Gudmundsson et al., 1997) (Gueguen et al., 1989) (Guillot et al., 2010) (Gull, 1988) (Gung et al., 2003) (Gung and Romanowicz, 2004) (Gutmann and Hyvärinen, 2012) (Haberland and Rietbrock, 2001) (Hadziioannou et al., 2012) (Halko et al., 2011) (Hall, 2002) (Halliday and Curtis, 2008) (Halliday and Curtis, 2009) (Hammond and Humphreys, 2000) (Hanasoge et al., 2011) (Hanasoge, 2013b) (Hanasoge, 2013a) (Hanasoge and Branicki, 2013) (Hanasoge, 2016) (Haned et al., 2016) (Hanson and Cunningham, 1998) (Hapla et al., 2018) (Honkela et al., 2015) (Hara et al., 1993) (Harmon et al., 2010) (Hart et al., 1992) (Hartog, 2017) (Hasselmann, 1963) (Hastings, 1970) (Hayes, 2011) (Haykin, 2009) (Hedjazian et al., 2020) (Hedlin et al., 1997) (Heikes and Randall, 1995a) (Heikes and Randall, 1995b) (Hejrani et al., 2017) (Hernlund et al., 2008) (Hess, 1964) (Hestenes and Stiefel, 1952) (HelMBERGER, 1983) (van der Hilst et al., 1997) (Hill, 2015) (Hillers et al., 2012) (Hillers et al., 2015) (Himmelblau, 1972) (Henstock et al., 1997) (van der Hilst et al., 1998) (Van Der Hilst et al., 1997) (Hingee et al., 2011) (Hoeffding, 1963) (Hoffmann and Gelman, 2014) (Hofmann, 1997) (Hounsfield, 1973) (Hornmann, 2016) (Hsieh et al., 2014) (Huang and Zhao, 2006) (Huang and Johnson, 2012) (Huang et al., 2016) (Hudson et al., 1989) (Hughes and Marsden, 1978) (Hu et al., 2001) (Hung et al., 2001) (Hutchinson, 1990) (Iacono et al., 2015) (Igel, 1999) (Igel and Gudmundsson, 1997) (Igel and Weber, 1996) (Igel et al., 1996) (Igel et al., 1995) (Igel et al., 2000) (Igel et al., 2005) (Igel, 2016) (Igel et al., 2021) (Ihlenburg, 1998) (Ingber, 1989) (Ingle, 1992) (Inoue et al., 1990) (Ishii and Tromp, 1999) (Ishii and Tromp, 2001) (Ishii and Tromp, 2004) (Isserlis, 1918) (Itoh, 1988) (ITU, 2022) (Iyer and Hirahara, 1993) (Izzatullah et al., 2021) (Jackson, 1976) (Jackson et al., 2002) (Jackson, 2000) (Jackson, 2007) (Jahnke et al., 2008) (Jakob-Chien and Alpert, 1997) (Jaynes, 2003) (Jeffreys, 1939) (Jeffreys and Bullen, 1940) (Jeong et al., 2012) (Jih et al., 1988) (Jolivet et al., 1994) (Jordan, 1978a) (Jordan, 1975) (Jordan, 1978b) (Jordan, 2015) (Jost and Herrmann, 1989) (Käufel et al., 2013) (Käufel et al., 2015) (Kaneshima and Helffrich, 2009) (Kang and McMechan, 1990) (Kang and Baag, 2004) (Karabulut et al., 2003) (Karaoğlu and Romanowicz, 2018a) (Karaoğlu and Romanowicz, 2018b) (Karason and van der Hilst, 2000) (Karato and Spetzler, 1990) (Karato, 1995) (Karato, 2008) (Karato, 2014) (Karato et al., 2015) (Kawamoto, 2006) (Kawai and Geller, 2010) (Kawakatsu et al., 2000) (Kawakatsu et al., 2009) (Keilis-Borok and Yanovskaya, 1967) (Kelly et al., 1976) (Givoli and Keller, 1989) (Kennett and Nolet, 1978) (Kennett, 1985) (Kennett, 1978) (Kennett, 1997) (Kennett and Williamson, 1987) (Kennett et al., 1988) (Kennett and Sambridge, 1998) (Kennett and Bowman, 1990) (Kennett and Abdullah, 2011) (Kennett and Fichtner, 2012) (Kennett et al., 2013) (Kendall and Silver, 1996) (Kendall and Silver, 1998) (Kennett et al., 1998) (Kennett and Engdahl, 1991) (Kennett et al., 1995) (Kennett, 1998) (Kennett, 2001) (Kennett and Furumura, 2008) (Kennett and Bunge, 2008) (Kennett, 2020) (Keogh and Mueen, 2011) (Keskin, 2003) (Kessler and Kosloff, 1990) (Khan et al., 2013) (Kikuchi and Kanamori, 1991) (Kim et al., 1998) (Kim et al., 1999) (Kim et al., 2010) (Kimman and Trampert, 2010) (King et al., 2001) (Kirkpatrick et al., 1983) (Kirby and Swain, 2006) (Kissling, 1988) (Kiwiel, 2001) (Klaasen et al., 2021) (Klaasen et al., 2022) (Klimeš, 2002) (Knopoff and Randall, 1970) (Kobayashi et al., 1995) (Köhn et al., 2010) (Koelemeijer et al., 2017) (Koelemeijer et al., 2015) (Kohnen, 1974) (Kolmogorov, 1941) (Kolmogorov, 1950) (Komatitsch and Vilotte, 1998) (Komatitsch, 1997) (Komatitsch and Tromp, 1999a) (Komatitsch and Tromp, 2002b) (Komatitsch and Tromp, 2002a) (Komatitsch et al., 2000b) (Komatitsch et al., 2000a) (Komatitsch and Tromp, 1999b) (Komatitsch et al., 1999) (Komatitsch et al., 2010) (Komatitsch, 2011) (Kong, 1992) (Konishi et al., 2009) (Korattikara et al., 2014) (Korneev and Bakulin, 2006) (Kosloff and Bayssal, 1982) (Kosloff and Tal-Ezer, 1993) (Kosloff et al., 1990) (Kosmas and Rappaport, 2006) (Kotsi et al., 2020) (Koulakov et al., 2010) (Koulakov et al., 2013) (Kozlovskaya et al., 2007) (Krass et al., 1998) (Krebs et al., 2009) (Kremer et al., 2014) (Kremers et al., 2011) (Krischer et al., 2015) (Krischer et al., 2018) (Kristek et al., 2002) (Kristekova et al., 2006) (Kristekova et al., 2009) (Kuang and Bloxham, 1997) (Kullback and Leibler, 1951) (Kumazawa and Anderson, 1969) (Kurrle and Widmer-Schmidrig, 2006) (Kuo and Romanowicz, 2002) (Kuo et al., 2009) (Lailly, 1983) (Landau and Lifshitz, 1976) (Lanczos, 1950) (Lange et al., 2015) (Langston, 1979) (Larmat et al., 2006) (Larose et al., 2004) (Laske and Masters, 1999) (Laske and Masters, 1996) (Lay, 1995) (Lay et al., 1998a) (Lay et al., 1997) (Lay et al., 1998b) (Lay et al., 2011) (Lebedev and van der Hilst, 2008) (Lecocq et al., 2014) (Lee et al., 1999) (Lee et al.,

2014) (Lee et al., 2014) (Legendre et al., 2008) (Lei and Zhao, 2005) (Leimkuhler and Reich, 1994) (Leng et al., 2019) (Lekić et al., 2009) (Lekić et al., 2010) (Lekić and Romanowicz, 2011) (Leung and Qian, 2006) (Levander, 1988) (Levenberg, 1944) (Lévêque et al., 1993) (Levshin and Ratnikova, 1984) (Lewis et al., 2007) (Li and Romanowicz, 1995) (Li and Romanowicz, 1996) (Li and Tanimoto, 1993) (Li and Oldenburg, 2000) (Li and van der Hilst, 2010) (Li et al., 2008) (Li et al., 2015) (Lim et al., 2014) (Lin et al., 2008) (Lin et al., 2013) (Lin et al., 2013) (Lin et al., 2012) (Lin and Tsai, 2012) (Lindgren et al., 2013) (Lindsey et al., 2017) (Lindsey et al., 2020) (Lindsey and Martin, 2021) (Fichtner et al., 2021) (Lions, 1968) (Lipovsky and Dunham, 2015) (Lipovsky, 2018) (Liu et al., 1976) (Liu and Dziewoński, 1998a) (Liu and Nocedal, 1989) (Liu and Dziewoński, 1998b) (Liu et al., 2004) (Liu and Tromp, 2006) (Liu and Tromp, 2008) (Liu and Gurnis, 2008) (Liu and Gu, 2012) (Liu and Ben-Zion, 2013) (Liu et al., 2019a) (Liu et al., 2019b) (Liu and Peter, 2020) (Lyu et al., 2021) (Lobkis and Weaver, 2001) (Lognonné, 1989) (Lognonné and Clévéde, 2000) (Lognonné and Clévéde, 1997a) (Lognonné and Romanowicz, 1990) (Lognonné, 1991) (Lognonné et al., 1998) (Lognonné and Clévéde, 1997b) (Longuet-Higgins, 1950) (Loper and Lay, 1995) (Love, 1927) (Lowrie and Fichtner, 2020) (Lu et al., 2018) (Ludwig et al., 1970) (Luo and Schuster, 1991) (Luo et al., 2020) (Lyakhovskiy and Ben-Zion, 2009) (Lysmer and Drake, 1972) (Ma and Hale, 2013) (MacCarthy et al., 2011) (Maceira and Ammon, 2009) (MacKay, 2003) (Mackenzie, 1989) (McNamara and Boaz, 2019) (Madariaga, 1972) (Madariaga, 1976) (Maday and Patera, 1989a) (Maday and Quarteroni, 1982) (Maday and Patera, 1989b) (Maday et al., 1988) (Madec et al., 2009) (Maggi et al., 2009) (Mai and Thingbaijam, 2014) (Mainprice et al., 2005) (Malcolm et al., 2004) (Malcolm and Trampert, 2011) (Kotsi et al., 2018) (Malinverno, 2002) (Malinverno, 2005) (Malischewsky, 1987) (Agranovich and Marchenko, 1963) (Marelli et al., 2012) (Marfut, 1984) (Marinari and Parisi, 1992) (Marone et al., 2007) (Marone and Romanowicz, 2007) (Marquardt, 1963) (Marquering et al., 1999) (Marra et al., 2018) (Martin et al., 2012) (Martin et al., 2017) (Martino et al., 2016) (Martyna and Tuckerman, 1995) (Marty et al., 2021) (Maruyama and Okamoto, 2007) (Masters et al., 1996) (Masters et al., 1996) (Mateeva et al., 2013) (Mateeva et al., 2014) (Matzel et al., 1996) (Matsubara et al., 2008) (Maurer et al., 2009) (Maurer et al., 2010) (Maykut and McPhee, 1995) (Mayor and Quéloz, 1995) (McGuire and Ben-Zion, 2005) (Mecozzi et al., 2021) (Megies et al., 2011) (Méglin and Romanowicz, 2000) (Meier et al., 2004) (Meier et al., 2007b) (Meier et al., 2007a) (Meier et al., 2010) (Meju, 2009) (Meju and Sakkas, 2007) (Meles et al., 2010) (Melo et al., 2013) (Meltzer et al., 1999) (Menke, 2012) (Menon et al., 2012) (Mercurat and Nolet, 2012) (Merilees, 1973) (Merilees, 1974) (Meschede

and Romanowicz, 2015) (Métivier et al., 2016) (Métivier and Brossier, 2016) (Metropolis et al., 1953) (Metropolis, 1987) (Michea and Komatitsch, 2010) (Miller et al., 2006) (Millot-Langet et al., 2003) (Minster and Jordan, 1978) (Mitchell, 1995) (Mittler et al., 1998) (Miyashiro, 1986) (Moczo et al., 2000) (Moczo et al., 2002) (Moczo and Kristek, 2005) (Mochizuki, 1986) (Moczo et al., 2014) (Modrak and Tromp, 2016) (Molinari and Morelli, 2011) (Montagner and Jobert, 1988) (Montagner and Anderson, 1989) (Montagner and Romanowicz, 1993) (Montagner, 1994) (Montagner et al., 1995) (Montagner, 1996) (Monteiller et al., 2012) (Montelli et al., 2004) (Montelli et al., 2004) (Montelli et al., 2006) (Morelli and Dziewoński, 1993) (Mora, 1987) (Mora, 1988) (Mora, 1989) (Mordret et al., 2013) (Mordret et al., 2014) (Mordret et al., 2014) (Mori and Helmberger, 1995) (Morris, 1995) (Morelli et al., 1986) (Morgan, 1971) (Morozova et al., 1999) (Mosca et al., 2012) (Mosegaard and Tarantola, 1995) (Mosegaard, 2012) (Motoki and Ballmer, 2015) (Mulargia, 2012) (Muir and Tkalčić, 2015) (Muir and Tkalčić, 2020) (Mustać and Tkalčić, 2016) (Nakahigashi et al., 2015) (Nakajima and Hasegawa, 2007) (Nakata et al., 2015) (Nakata and Nishida, 2019) (Nakata et al., 2019) (Nataf and Vandecar, 1993) (Nataf and Ricard, 1996) (Nawa et al., 1998) (Neal, 1996) (Neal, 2011) (Nemeth et al., 1999) (Nettles and Dziewoński, 2008) (Ni and Helmberger, 2000) (Nielsen et al., 2003) (Nishida and Fukao, 2007) (Nishida and Montagner, 2009) (Nishida, 2011) (Nishida, 2013) (Nishida, 2014) (Nissen-Meyer et al., 2007) (Nissen-Meyer et al., 2007) (Nissen-Meyer et al., 2008) (Nissen-Meyer et al., 2014) (Nocedal, 1980) (Nocedal and Wright, 1999) (Nolet, 1990) (Nolet et al., 1999) (Nolet and Montelli, 2005) (Nolet, 2008) (O'Toole et al., 2012) (Obayashi et al., 2006) (Obermann et al., 2013) (Obermann et al., 2014) (Obermann et al., 2015) (Okay and Tüysüz, 1999) (Olinger et al., 2022) (Olson et al., 1987) (Omori and Komabayashi, 2007) (Onarheim et al., 2014) (Operto et al., 2004) (Operto et al., 2009) (Orszag, 1980) (Owen et al., 2012) (Öztürk et al., 2006) (Sánchez-Sesma and Campillo, 1991) (Pankajakshan et al., 2000) (Paitz et al., 2019) (Paitz et al., 2021) (Panning and Romanowicz, 2006) (Park, 1986) (Park, 1987) (Park, 1989) (Park, 1990) (Park et al., 2006) (Park and Gilbert, 1986) (Parker, 1977) (Parker, 1994) (Park and Yu, 1992) (Parsons et al., 2000) (Passier and Snieder, 1995) (Patera, 1984) (Pau and George, 2014) (Pavese et al., 1995) (Pearson, 1969) (Pedersen, 2006) (Boué and Poli, 2015) (Perelson et al., 1993) (Perovich and Elder, 2002) (Perovich et al., 2007) (Peter et al., 2007) (Peter et al., 2008) (Peter et al., 2009) (Peter et al., 2011) (Peterson, 1993) (Phinney and Burridge, 1973) (Planes et al., 2015) (Plessix, 2006) (Podvin and Lecomte, 1991) (Poincaré, 1890) (Polak and Ribière, 1969) (Poli et al., 2012) (Poli et al., 2015) (Pollitz, 1992) (Pollitz, 1994) (Pollitz, 1998) (Poore et al., 2011) (Popovici and Sethian, 2002) (Popper, 1935) (Porter et al., 2018) (Postma, 1955) (Postpischl et al.,

2011) (Pouliquen and Forterre, 2009) (Poulton, 2001) (Press and Ewing, 1951) (Press, 1968) (Press, 1970) (Priestley and McKenzie, 2006) (Lawrence and Prieto, 2011) (Prieto et al., 2011) (Prioux et al., 2013) (Priolo et al., 1994) (Pulliam and Sen, 1999) (Pulliam et al., 1993) (Pratt et al., 1998) (Pratt, 1999) (Pratt et al., 2007) (Radon, 1917) (Raftery and Lewis, 1992) (Randall and Knopoff, 1970) (Rančić et al., 1996) (Rastrigin, 1974) (Raterron et al., 2009) (Ravaut et al., 2004) (Rawlinson and Sambridge, 2004b) (Rawlinson and Sambridge, 2004a) (Rawlinson et al., 2006) (Rawlinson and Urvoy, 2006) (Rawlinson and Kennett, 2009) (Rawlinson et al., 2011) (Rawlinson et al., 2010) (Rawlinson et al., 2014) (Razafindrakoto and Mai, 2014) (Reading et al., 2014) (Reid et al., 2001) (Resovsky and Ritzwoller, 1999a) (Reshef et al., 1988) (Resovsky and Ritzwoller, 1999b) (Resovsky and Trampert, 2002) (Resovsky and Trampert, 2003) (Resovsky et al., 2005) (Retailleau and Gualtieri, 2019) (Retailleau et al., 2020) (Revenaugh and Meyer, 1997) (Rhie and Romanowicz, 2006) (Riahi et al., 2013) (Ribe, 1989) (Ricard et al., 1993) (Richard and Bercovici, 2009) (Richard and Iwamori, 2010) (Rickers et al., 2012) (Rickers et al., 2013) (Rickett and Claerbout, 1999) (Rickett and Claerbout, 2000) (Riedesel and Jordan, 1989) (Rietmann et al., 2012) (Rietmann et al., 2017) (Ripley, 1987) (Ritzwoller and Lavelly, 1995) (Ritzwoller and Feng, 2019) (Ritsema et al., 1998) (Ritsema et al., 1999) (Ritsema and van Heijst, 2002) (Ritsema et al., 2011) (Riznichenko, 1949) (Robertsson et al., 1994) (Roberts and Tweedie, 1996) (Robertsson, 1996) (Robin, 1958) (Rokhlin et al., 2009) (Romanowicz and Roullet, 1986) (Romanowicz and Snieder, 1988) (Romanowicz, 1987) (Romanowicz, 1995) (Romanowicz, 2001) (Romanowicz, 2003) (Romanowicz and Mitchell, 2007) (Ronchi et al., 1996) (Rong et al., 2007) (Rosenberg et al., 2007) (Rosenblueth and Wiener, 1945) (Rosenbrock, 1960) (Rosenthal, 2011) (Roullet et al., 1994) (Roux, 2009) (Ruan and Zhou, 2010) (Rudolph, 1990) (Ruelas and Greene, 2013) (Roy, 2019) (Rudin, 1966) (Rüpke et al., 2004) (Ruth, 1983) (Rydberg et al., 2000) (Rytov, 1965) (Qi and Minka, 2002) (Quarteroni et al., 2000) (Quispel and McLaren, 2008) (Sabra et al., 2005) (Sadourny, 1972) (Sager et al., 2018) (Sager et al., 2018) (Sager et al., 2020) (Saito, 1988) (Salaün et al., 2012) (Sambridge et al., 1991) (Sambridge and Drijkoningen, 1992) (Sambridge, 1999a) (Sambridge, 1999b) (Sambridge and Mosegaard, 2002) (Sambridge et al., 2006) (Sambridge et al., 2013) (Sambridge, 2014) (Samuelson, 1943) (Sánchez-Sesma and Campillo, 2006) (Santosa, 1982) (Santosa and Symes, 1988) (Sanz-Serna and Calvo, 1994) (Sargan, 1975) (Sauer and Heydt, 1979) (Saunders et al., 1998) (Saxena and Alam, 1982) (Saygin and Kennett, 2012) (Scales and Snieder, 1997) (Scales and Snieder, 2000) (Schäfer et al., 2011) (Schaeffer and Lebedev, 2013) (Schimmel and Paulssen, 1997) (Schimmel et al., 2011) (Schimmel et al., 2018) (Schivardi and Morelli, 2011) (Schmidt and Poli, 1998) (Schuster and Hu, 2000) (Schuster et al., 2004) (Schulte-Pelkum et al., 2001) (Schulte-Pelkum et al., 2004) (Schulte-Pelkum and Ben-Zion, 2012) (Shumway and Stoffer, 2010) (Scognamiglio et al., 2009) (Scott et al., 2016) (Seah et al., 2015) (Seats et al., 2012) (Selby and Woodhouse, 2002) (Sen and Stoffa, 2013) (Sen and Biswas, 2017) (Sengör et al., 2003) (Şengör et al., 2005) (Seriani and Priolo, 1994) (Seriani and Su, 2012) (Sánchez-Sesma and Vai, 1998) (Sethian, 1996) (Sethian and Popovici, 1999) (Seydoux et al., 2017) (Shaw-Champion et al., 2008) (Shanno, 1970) (Shannon, 1948) (Shao et al., 2011) (Shapiro and Campillo, 2004) (Shapiro et al., 2005) (Shapiro, 2019) (Shearer et al., 1998) (Shen and Siliciano, 2008) (Shen et al., 2012) (Shen et al., 2013) (Sheng et al., 2016) (Sherman and Morrison, 1950) (Shin and Min, 2006) (Shin and Cha, 2008) (Siebert and Simkin, 2002) (Siebert et al., 2010) (Sieminski et al., 2007b) (Sieminski et al., 2007a) (Sieminski et al., 2009) (Sigloch et al., 2008) (Silveira et al., 1998) (Silver and Chan, 1988) (Simo et al., 1992) (Simon et al., 2006) (Simons et al., 2003) (Simmons et al., 2010) (Simmons et al., 2012) (Simute et al., 2016) (Singh et al., 2000) (Sipkin and Jordan, 1979) (Sirgue and Pratt, 2004a) (Sirgue et al., 2010) (Silwal and Tape, 2016) (Sleep and Toksöz, 1971) (Slepian, 1978) (Sleijpen and van der Vorst, 2000) (Small et al., 2017) (Smithyman et al., 2009) (Snieder, 1988) (Snieder and Romanowicz, 1988) (Snieder, 1986a) (Snieder, 1986b) (Snieder and Nolet, 1987) (Snieder and Trampert, 1999) (Snieder, 2004) (Snieder and Şafak, 2006) (Snieder et al., 2006) (Snieder et al., 2009) (Snieder et al., 2010) (Soldati et al., 2006) (Song and Helmberger, 1993) (Song and Richards, 1996) (Souriau et al., 1997) (Souriau and Romanowicz, 1997) (Spakman, 1991) (Spakman et al., 1993) (Spica et al., 2020) (Spotz and Carey, 2000) (Spotz et al., 2000) (Spotz et al., 1998) (Sirgue and Pratt, 2004b) (Starius, 1977) (Starius, 1980) (Stacey and Loper, 1983) (Staehler and Sigloch, 2014) (Staehler and Sigloch, 2017) (Stange and Friederich, 1992) (Stead and Helmberger, 1988) (Stefan, 1891) (Stein et al., 1997) (Stehly et al., 2006) (Stehly et al., 2007) (Stehly et al., 2008) (Stehly et al., 2009) (Stehly et al., 2011) (Stehly and Cupillard, 2016) (Diaz-Steptoe, 2013) (Stephani and Kluge, 1995) (Stich et al., 2009) (Stixrude and Lithgow-Bertelloni, 2005) (Stixrude and Lithgow-Bertelloni, 2011) (Struve, 1952) (Stutzmann et al., 1997) (Stutzmann et al., 2000) (Stutzmann et al., 2012) (Styblinski and Tang, 1990) (Su et al., 1994b) (Su et al., 1993) (Su et al., 1994a) (Sun and Kennett, 2016) (Swarztrauber, 1993) (Swarztrauber, 1996) (Symes, 1980) (Symes, 2008) (Symon, 1971) (Szu and Hartley, 1987) (Taillandier et al., 2009) (Taira, 2001) (Takam Takougang and Calvert, 2011) (Takeuchi and Saito, 1972a) (Takeuchi and Fialko, 2012) (Taylor et al., 1997) (Takeuchi and Geller, 2000) (Takeuchi et al., 2000) (Takeuchi et al., 1996) (Takeuchi and Saito, 1972b) (Tang et al., 2014) (Tanimoto, 1984a) (Tanimoto, 1984b) (Tanimoto, 1986) (Tanimoto, 1991) (Tao and King,

1990) (Tape et al., 2007) (Tape et al., 2009) (Tape et al., 2010) (Tape and Tape, 2012) (Tape and Tape, 2015) (Tarantola and Valette, 1982a) (Tarantola and Valette, 1982b) (Tarantola, 1984) (Tarantola, 1986) (Tarantola, 1988) (Tarantola, 2005) (Tatsumi, 1989) (Tatsumi et al., 1990) (Tessmer et al., 1992) (Tessmer, 2000) (Thomas et al., 2000) (Thompson, 1992) (Thomson, 1950) (Thomson, 1982) (Thordarson and Self, 2003) (Thrustarson et al., 2020) (Thrustarson et al., 2021) (Thurin et al., 2019) (Thybo and Perchuc, 1997) (Tian et al., 2009) (Tian and Ritzwoller, 2015) (Tkalčić et al., 2008) (Tondi et al., 2000) (Tondi et al., 2009) (Tone et al., 2009) (Tong et al., 1998) (Tong et al., 2017) (Tork Qashqai et al., 2019) (Toxvaerd, 1994) (Toxvaerd et al., 2012) (Traer and Gerstoft, 2014) (Trampert and Woodhouse, 1995) (Trampert and van Heijst, 2002) (Trampert and Woodhouse, 2003) (Trampert et al., 2004) (Trampert and Fichtner, 2013) (Trampert et al., 2013) (Tromp and Dahlen, 1990) (Tromp and Dahlen, 1992) (Tromp and Dahlen, 1993) (Tromp et al., 2005) (Tromp et al., 2010) (Tromp and Bachmann, 2019) (Trujillo et al., 2001) (Tsai, 2009) (Tsai, 2010) (Tsai, 2011) (Turcotte and Schubert, 2014) (Turin, 1960) (Turner, 1942) (Um et al., 1991) (Unwin, 2004) (Vackár et al., 2017) (Vai et al., 1999) (Valentine and Woodhouse, 2010b) (Valentine and Woodhouse, 2010a) (Valentine and Trampert, 2012) (Valentine and Trampert, 2016) (Valette, 1986a) (Valette, 1987) (Valette, 1989b) (Valette, 1989a) (Valette, 1986b) (Vallée, 2013) (Vanacore et al., 2013) (van Driel and Nissen-Meyer, 2014a) (van Driel and Nissen-Meyer, 2014b) (van Driel et al., 2015) (van Driel et al., 2020) (van Herwaarden et al., 2020) (van Herwaarden et al., 2019) (van Herwaarden et al., 2018) (van Hinsbergen et al., 2010) (van Leeuwen and Mulder, 2010) (van Leeuwen and Herrmann, 2013) (van Dalen et al., 2014) (van der Neut et al., 2011) (van Vleck and Middleton, 1966) (Vasconcelos and Snieder, 2008a) (Vasconcelos and Snieder, 2008b) (Vasconcelos et al., 2009) (Vaseghi, 2007) (Vasco and Johnson, 1998) (Verbeke et al., 2012) (Verlet, 1967) (Verma, 1960) (Vidale and Hedlin, 1998) (Vidale et al., 2000) (Viens et al., 2017) (Viens and Denolle, 2019) (Vinnik et al., 1996) (Vinnik et al., 1989) (Vinnik et al., 1995) (Vinnik et al., 1997) (Vinnik et al., 1998) (Virieux, 1984) (Virieux, 1986) (Virieux and Operto, 2009) (Visser et al., 2008) (Visser et al., 2019) (Wakita, 2013) (Waldrop, 2016) (Walter et al., 2020) (Wang and Dahlen, 1995) (Wang and Xu, 2015) (Ware and Aki, 1969) (Warner et al., 2013) (Warren and Shearer, 2002) (Wapenaar, 2004) (Wapenaar and Fokkema, 2006) (Wapenaar et al., 2008) (Wapenaar and van der Neut, 2010) (Wapenaar et al., 2011) (Wapenaar et al., 2011) (Wapenaar et al., 2013) (Wapenaar et al., 2014) (Wassermann, 2012) (Weaver and Lobkis, 2004) (Weaver, 2008) (Weaver, 2011) (Weaver and Yoritomo, 2018) (Weber, 1993) (Wéber, 2006) (Weemstra et al., 2013) (Wei et al., 2012) (Wei et al., 2012) (Wei et al., 2015) (Wei et al., 2015) (Welch, 1967) (Wen and Helmberger, 1998b) (Wen and Helmberger,

1998a) (Whitehead and Luther, 1975) (Widmer et al., 1991) (Widiyantoro and van der Hilst, 1997) (Wielandt, 1987) (Wiener, 1949) (Wiggins, 1972) (Williams and Garner, 1996) (Wolfe et al., 1997) (Wolpert and Macready, 1997) (Woodard, 1997) (Woodhouse, 283) (Woodhouse, 1983) (Woodhouse and Dahlen, 1978a) (Woodhouse and Wong, 1986) (Woodhouse and Dziewoński, 1984) (Woodhouse et al., 1986) (Woodhouse, 1988) (Woodhouse and Dahlen, 1978b) (Woodhouse and Girnius, 1982) (Woodhouse and Deuss, 2007) (Worthen et al., 2014) (Wu and Aki, 1985) (Wu and Toksöz, 1987) (Wysesession et al., 2000) (Xu et al., 2019) (Yamazaki et al., 1997) (Yanovskaya, 1997) (Yanovskaya, 2000) (Yanovskaya et al., 2016) (Yan and Clayton, 2007) (Yang et al., 2007) (Yang and Ritzwoller, 2008) (Yang et al., 2021) (Yao and van der Hilst, 2009) (Yarvin and Rokhlin, 1998) (Ying, 1996) (Ying and Nataf, 1998) (Yu and Park, 1993) (Yu et al., 2002) (Yolsal-Çevikbilen et al., 2012) (Yomogida, 1992) (Yoritomo and Weaver, 2016) (Yoshida, 1990) (Yoshizawa and Kennett, 2004) (Yoshizawa and Kennett, 2005) (Yoshizawa and Ekström, 2010) (Yoshizawa et al., 2010) (Yuan et al., 2015) (Zaroli et al., 2017) (Zaroli, 2019) (Ismail-Zadeh et al., 2013) (Zhao, 2004) (Zhao et al., 2007) (Zhao and Ohtani, 2009) (Zhao and Tian, 2013) (Zhao and Dahlen, 1996) (Zhao et al., 2005) (Zhao et al., 2000) (Zhan et al., 2013) (Zhang and Tanimoto, 1993) (Zhang et al., 2007) (Zhang et al., 2007) (Zhang and Curtis, 2020) (Zienkiewicz and Morgan, 1983) (Zielhuis and Nolet, 1994b) (Zielhuis and Nolet, 1994a) (Zhang and Karato, 1996) (Zhao et al., 2004) (Zhao et al., 2006) (Zhang and Sutton, 2011) (Zheng et al., 2011) (Zhou et al., 1995) (Zhou et al., 2004) (Zhou et al., 2006) (Zhou, 2009a) (Zhou, 2009b) (Zhou et al., 2011) (Zhu, 2000) (Zhu et al., 2007) (Zhu et al., 2012) (Zhu et al., 2013) (Zhu et al., 2015) (Zhu and Zhou, 2016) (Zunino et al., 2009) (Zunino and Mosegaard, 2018)

## ACKNOWLEDGMENTS

Acknowledgements text goes here. Acknowledgements text goes here.

## REFERENCES

- Abramowitz, M. and I. A. Stegun (1972). *Handbook of mathematical functions*. Dover, New York.
- Adams, B. M., H. T. Banks, M. Davidian, H.-D. Kwon, H. T. Tran, S. N. Wynne, and E. S. Rosenberg (2005). Hiv dynamics: modeling, data analysis, and optimal treatment protocols. *Journal of Computational and Applied Mathematics* **184**(1), 10–49.
- Adams, J. and P. Swartztrauber (1997, September). Sperepack 2.0: A model development facility. Technical Report TN-436-STR, NCAR, Boulder, CO.

- Adiyaman, O., J. Chorowicz, O. N. Arnaud, M. N. Gündođdu, and A. Gourgaud (2001). Late Cenozoic tectonics and volcanism along the North Anatolian Fault: New structural and geochemical data. *Tectonophysics* **338**, 135–165.
- Afanasiev, M. V., C. Boehm, M. van Driel, L. Krischer, M. Rietmann, D. A. May, M. G. Knepley, and A. Fichtner (2019). Modular and flexible spectral-element waveform modelling in two and three dimensions. *Geophys. J. Int.* **216**, doi: 10.1093/gji/ggy469.
- Afanasiev, M. V., D. B. Peter, K. Sager, S. Simute, L. Ermert, L. Krischer, and A. Fichtner (2016). Foundations for a multi-scale collaborative Earth model. *Geophys. J. Int.* **204**, 39–58.
- Afanasiev, M. V., R. G. Pratt, R. Kamei, and G. McDowell (2014). Waveform-based simulated annealing of crosshole transmission data: A semi-global method for estimating seismic anisotropy. *Geophys. J. Int.* **199**, 1586–1607.
- Afonso, J. C., J. Fulla, W. L. Griffin, Y. Yang, A. G. Jones, J. A. D. Connolly, and S. Y. O'Reilly (2013). 3-D multiobservable probabilistic inversion for the compositional and thermal structure of the lithosphere and upper mantle. I: a priori petrological information and geophysical observables. *J. Geophys. Res.* **118**, 2586–2617.
- Agliz, D. and A. Atmani (2013). Seismic signal classification using a multi-layer perceptron neural network. *Int. J. Comp. Alg.* **79**, 35–43.
- Agranovich, Z. S. and V. A. Marchenko (1963). *The inverse problem of scattering theory*. Gordon and Breach, New York.
- Agrawal, G. P. (2012). *Fiber-optic communication systems*. John Wiley & Sons.
- Ahmad, F. and M. Razzaghi (1998). A numerical solution to the Gel'Fand-Levitan-Marchenko equation. *Appl. Math. Comp.* **89**, 31–39.
- Ajo-Franklin, J. B., S. Dou, N. J. Lindsey, I. Monga, C. Tracy, M. Robertson, V. Rodriguez Tribaldos, C. Ulrich, B. Freifeld, T. Daley, and X. Li (2019). Distributed acoustic sensing using dark fiber for near-surface characterisation and broadband seismic event detection. *Sci. Rep.* **9**, doi:10.1038/s41598-018-36675-8.
- Aki, K. (1957). Space and time spectra of stationary stochastic waves, with special reference to microtremors. *Bull. Earthq. Res. Inst., Univ. Tokyo* **35**, 415–457.
- Aki, K. (1980a). Attenuation of shear-waves in the lithosphere for frequencies from 0.05 to 25 Hz. *Phys. Earth Planet. Int.* **21**, 50–60.
- Aki, K. (1980b). Scattering and attenuation of shear waves in the lithosphere. *J. Geophys. Res.* **85**, 6496–6504.
- Aki, K. (1981). Attenuation and scattering of short-period seismic waves in the lithosphere. In E. Husebye and S. Mykkeltveit (Eds.), *Identification of Seismic sources— earthquake or underground explosion*, pp. 515–541. Dordrecht: Reidel.
- Aki, K., A. Christofferson, and E. S. Husebye (1976). Determination of three-dimensional seismic structure of the lithosphere. *J. Geophys. Res.* **81**, 277–296.
- Aki, K. and W. H. K. Lee (1976). Determination of three-dimensional velocity anomalies under a seismic array using first P arrival times from local earthquakes - 1. A homogeneous initial model. *J. Geophys. Res.* **81**, 4381–4399.
- Aki, K. and H. Patton (1978). Determination of seismic moment tensor using surface waves. *Tectonophysics* **49**, 213–222.
- Aki, K. and P. Richards (1980). *Quantitative Seismology: Theory and Methods*. Freeman, San Francisco.
- Aki, K. and P. Richards (2002). *Quantitative Seismology*. University Science Books.
- Alberts, B., A. Johnson, J. Lewis, M. Raff, K. Roberts, and P. Walter (2002). Helper t cells and lymphocyte activation. In *Molecular Biology of the Cell. 4th edition*. Garland Science.
- Alkhalifah, T. (2000). An acoustic wave equation for anisotropic media. *Geophysics* **65**, 1239–1250.
- Almomin, A. and B. Biondi (2012). Tomographic full waveform inversion: Practical and computationally feasible approach. *SEG Technical Program Expanded Abstracts* **31**, 500–505.
- Alt, W. (2002). *Nichtlineare Optimierung*. Vieweg und Sohn, Braunschweig/Wiesbaden.
- Alterman, Z., J. Aboudi, and F. Karal (1970). Pulse propagation in a laterally heterogeneous solid elastic sphere. *Geophys. J. R. Astr. Soc.* **21**, 243–260.
- Alterman, Z. and F. C. Karal (1968). Propagation of elastic waves in layered media by finite-difference methods. *Bull. Seis. Soc. Am.* **58**, 367–398.
- Amante, C. and B. W. Eakins (2009). ETOPO1 1 arc-minute relief model: Procedures, data sources and analysis. *NOAA Technical Memorandum NGDC-24*, 19pp.
- Aminzadeh, F., W. Sandham, and M. Leggett (2013). *Geophysical applications of artificial neural networks and fuzzy logic*. Springer.
- Ammon, C. J., T. Lay, H. Kanamori, and M. Cleveland (2011). A rupture model of the 2011 off the Pacific coast of Tohoku earthquake. *Earth planet. Space* **63**, 693–696.
- Ammon, C. J., G. E. Randall, and G. Zandt (1990). On the nonuniqueness of receiver function inversions. *J. Geophys. Res.* **95**, 15303–15318.
- An, M. (2012). A simple method for determining the spatial resolution of a general inverse problem. *Geophys. J. Int.* **191**, 849–864.
- Anderson, D. L. (2005). Scoring hotspots: The plume and plate paradigms. *Geol. Soc. Am. Special Paper* **338**, 31–54.
- Anderson, D. L. and J. B. Minster (1979). The frequency dependence of Q in the Earth and implications from mantle rheology and Chandler wobble. *Geophys. J. R. astr. Soc.* **58**, 431–440.
- Anderson, D. L., E. Schreiber, R. C. Lieberman, and N. Soga (1968). Some elastic constant data on minerals relevant to geophysics. *Rev. Geophys. Space Phys.* **6**, 491–524.
- Anderson, R. M. (1998). Complex dynamic behaviours in the interaction between parasite populations and the host's immune system. *International journal for parasitology* **28**(4), 551–566.
- Anderssen, R. S. and E. Seneta (1971). A simple statistical estimation procedure for Monte Carlo inversion in geophysics. *Pure. Appl. Geophys.* **91**, 5–13.
- Aoki, N. and G. T. Schuster (2009). Fast least-squares migration with a deblurring filter. *Geophysics* **74**, WCA83–WCA93.
- Archuleta, R. J. (1984). A faulting model for the 1979 Imperial Valley earthquake. *J. Geophys. Res.* **89**, 4559–4585.
- Ardhuin, F., L. Gualtieri, and E. Stutzmann (2015). How ocean waves rock the earth: Two mechanisms explain microseisms with periods 3 to 300 s. *Geophys. Res. Lett.* **42**(3), 765–772.

- Ardhuin, F., L. Gualtieri, and E. Stutzmann (2019). Physics of ambient noise generation by ocean waves. In N. Nakata, L. Gualtieri, and A. Fichtner (Eds.), *Seismic Ambient Noise*, pp. 109–143. Cambridge University Press, Cambridge, U.K.
- Ardhuin, F., E. Stutzmann, M. Schimmel, and A. Mangeney (2011). Ocean wave sources of seismic noise. *J. Geophys. Res.* **116**, doi:10.1029/2011JC006952.
- Arnoldi, W. E. (1951). The principle of minimized iteration in the solution of the matrix eigenvalue problem. *Quart. Appl. Math.* **9**, 17–29.
- Avron, H. and S. Toledo (2011). Randomized algorithms for estimating the trace of an implicit symmetric positive semi-definite matrix. *J. Ass. Comp. Mach.* **58**, doi:10.1145/1944345.
- Båth, M. (1968). *Mathematical aspects of seismology*. Elsevier Publishing Company, Amsterdam, London, New York.
- Babusška, I., B. Szabó, and I. Katz (1981). The  $p$  version of the finite element method. *SIAM J. Num. Anal.* **18**, 512–545.
- Babuška, I. and M. Dorr (1981). Error estimates for the combined  $h$  and  $p$  version of the finite element method. *Num. Math.* **37**, 257–277.
- Babuška, V. and M. Cara (1991). *Seismic anisotropy in the Earth*. Kluwer Academic Publishers, Dordrecht, Boston, London.
- Backer, G. (1976). Error estimates for the finite element method for second order hyperbolic equations. *SIMA J. Num. Anal.* **13**, 564–575.
- Backus, G. and J. Gilbert (1961). The rotational splitting of the free oscillations of the Earth. *Proc. Natl. Acad. Sci. U.S.A.* **47**, 362–371.
- Backus, G. E. (1962). Long-wave elastic anisotropy produced by horizontal layering. *J. Geophys. Res.* **67**, 4427–4440.
- Backus, G. E. and F. Gilbert (1967). Numerical application of a formalism for geophysical inverse problems. *Geophys. J. Roy. Astr. Soc.* **13**, 247–276.
- Backus, G. E. and F. Gilbert (1968). The resolving power of gross Earth data. *Geophys. J. Roy. Astr. Soc.* **16**, 169–205.
- Backus, G. E. and F. Gilbert (1970). Uniqueness in the inversion of inaccurate gross Earth data. *Phil. Trans. R. Soc. London, A* **266**, 123–192.
- Backus, G. E. and M. Mulcahy (1976a). Moment tensors and other phenomenological descriptions of seismic sources - I. Continuous displacements. *Geophys. J. R. astr. Soc.* **46**, 341–361.
- Backus, G. E. and M. Mulcahy (1976b). Moment tensors and other phenomenological descriptions of seismic sources - I. Continuous displacements. *Geophys. J. R. astr. Soc.* **46**, 341–361.
- Baig, A. M., M. Campillo, and F. Brenguier (2009). Denoising seismic noise cross correlations. *J. Geophys. Res.* **114**, doi:10.1029/2008JB006085.
- Baig, A. M. and F. A. Dahlen (2004). Traveltime biases in random media and the S-wave discrepancy. *Geophys. J. Int.* **158**, 922–938.
- Bakurcı, T., K. Yoshizawa, and M. F. Özer (2012). Three-dimensional S wave structure of the upper mantle beneath Turkey from surface wave tomography. *Geophys. J. Int.* **190**, 1058–1076.
- Bakulin, A. and R. Calvert (2004). Virtual source: New method for imaging and 4D below complex overburden. *74th Annual International Meeting, SEG, Expanded Abstracts*, 2477–2480.
- Bakulin, A. and R. Calvert (2006). The virtual source method: Theory and case study. *Geophysics* **71**, SI139–SI150.
- Ballmer, M., P. van Keken, and G. Ito (2015). Hotspots, large igneous provinces, and melting anomalies. In G. Schubert (Ed.), *Treatise on Geophysics* (2 ed.), Volume 7, pp. 371–435. Elsevier.
- Bamberger, A., G. Chavent, C. Hemons, and P. Lailly (1982). Inversion of normal incidence seismograms. *Geophysics* **47**, 757–770.
- Bamberger, A., G. Chavent, and P. Lailly (1977). Une application de la théorie du contrôle à un problème inverse sismique. *Ann. Geophys.* **33**, 183–200.
- Bamberger, A., G. Chavent, and P. Lailly (1979). About the stability of the inverse problem in 1d wave equations - application to the interpretation of seismic profiles. *Appl. Math. Opt.* **5**, 1–47.
- Bao, H., J. Bielak, O. Ghattas, L. F. Kallivokas, D. R. O'Hallaron, J. R. Shewchuk, and J. Xu (1998). Large-scale simulation of elastic wave propagation in heterogeneous media on parallel computers. *Computer Methods in Applied Mechanics and Enigneering* **152**, 85–102.
- Bao, X., E. Sandvol, Y. J. Chen, J. Ni, T. Hearn, and Y. Shen (2012). Azimuthal anisotropy and Lg attenuation in the eastern Tibetan Plateau. *J. Geophys. Res.* **117**, doi:10.1029/2012JB009255.
- Bardenet, R., A. Doucet, and C. Holmes (2014). Towards scaling up Markov chain Monte Carlo: an adaptive subsampling approach. In *Proc. 31st Int. Conf. Machine Learning*, pp. 405–413.
- Barka, A. A. (1992). The North Anatolian fault zone. *Ann. Tect.* **164–195**, 6.
- Barnes, C. and M. Charara (2008). Full-waveform inversion results when using acoustic approximations instead of elastic medium. *SEG Expanded Abstracts* **78**, 1895–1899.
- Barry, A., J. Bielak, and R. C. MacCamy (1988). On Absorbing Boundary Conditions for Wave Propagation. *J. Comput. Phys.* **79**, 449–468.
- Bartlett, M. S. (1946). On the theoretical specification of sampling properties of autocorrelated time series. *J. Roy. Stat. Soc. Suppl.* **8**, 27–41.
- Bartlett, M. S. (1951). An inverse matrix adjustment arising in discriminant analysis. *Ann. Math. Statist.* **22**, 107–111.
- Basini, P., T. Nissen-Meyer, L. Boschi, E. Casarotti, J. Verbeke, O. Schenk, and D. Giardini (2013). The influence of nonuniform ambient noise on crustal tomography in Europe. *Geochem. Geophys. Geosys.* **14**, 1471–1492.
- Bassin, C., G. Laske, and G. Masters (2000). The current limits of resolution for surface wave tomography in North America. *EOS Trans. AGU* **81**, F897.
- Bastow, I. D., S. Pilidou, J. M. Kendall, and G. W. Stuart (2010). Melt-induced seismic anisotropy and magma-assisted rifting in Ethiopia: evidence from surface waves. *Geochem. Geophys. Geosys.* **11**, doi:10.1029/2010GC003036.
- Bayes, T. and R. Price (1763). An essay toward solving a problem in the doctrine of chances. *Phil. Trans. R. Soc. London* **53**, 370–418.
- Bazaraa, M. S. and C. M. Shetty (1976). *Foundations of optimization*. Springer, Berlin, Heidelberg, New York.
- Becker, T. W. (2008). Azimuthal seismic anisotropy constrains net rotation of the lithosphere. *Geophys. Res. Lett.* **35**, doi:10.1029/2007GL032928.
- Becker, T. W. and L. Boschi (2002). A comparison of tomographic and geodynamic mantle models. *Geochem. Geophys. Geosys.* **3**, doi:10.129/2001GC000168.

- Becker, T. W., S. Chevrot, V. Schulte-Pelkum, and D. K. Blackman (2006). Statistical properties of seismic anisotropy predicted by upper mantle geodynamic models. *J. Geophys. Res.* **111**, doi:10.1029/2005JB004095.
- Behn, M. D., G. Hirth, and J. E. II (2009). Implications of grain-size evolution on the seismic structure of the oceanic upper mantle. *Earth Planet. Sci. Lett.* **282**, 178–189.
- Bekas, C., E. Kokopoulou, and Y. Saad (2007). An estimator for the diagonal of a matrix. *Appl. Num. Math.* **57**, 1214–1229.
- Ben Belgacem, F. (1993). *Discrétisations 3D non conformes par la méthode de décomposition de domaine des éléments avec joints : analyse mathématique et mise en oeuvre pour le problème de Poisson*. Thèse de doctorat, Université Pierre et Marie Curie.
- Ben Belgacem, F. (1999). The mortar finite element method with Lagrange multipliers. *Num. Math.* **84**, 173–197.
- Ben Belgacem, F. and Y. Maday (1994). A spectral element methodology tuned to parallel implementations. *Comput. Methods Appl. Mech. Engrg.* **116**, 59–67.
- Ben Hadj Ali, H., S. Operto, J. Virieux, and F. Sourbier (2009a). Efficient 3D frequency-domain full waveform inversion with phase encodings. In *71st Conference & Technical Exhibition, EAGE, Extended Abstracts*, pp. 5812.
- Ben Hadj Ali, H., S. Operto, J. Virieux, and F. Sourbier (2009b). Three-dimensional frequency-domain full-waveform inversion with phase encoding. In *79th Annual International Meeting, SEG, Extended Abstracts*, pp. 2288–2292.
- Ben-Zion, Y. (2008). Collective behavior of earthquakes and faults: Continuum-discrete transitions, progressive evolutionary changes, and different dynamic regimes. *Rev. Geophys.* **46**, doi:10.1029/2008RG00260.
- Bendinelli, O., G. Parmeggiani, and F. Zavatti (1987). An analytical approximation of the Hubble space telescope monochromatic point spread function. *J. Astrophys. Astr.* **8**, 343–350.
- Bensen, G. D., M. H. Ritzwoller, M. P. Barmin, A. L. Levshin, F. Lin, M. P. Moschetti, N. M. Shapiro, and Y. Yang (2007). Processing seismic ambient noise data to obtain reliable broad-band surface wave dispersion measurements. *Geophys. J. Int.* **169**, 1239–1260.
- Bercovici, D. and S. Karato (2003). Whole-mantle convection and the transition-zone water filter. *Nature* **425**, 39–44.
- Bernardi, C. and Y. Maday (1992). *Approximations spectrales de problèmes aux limites elliptiques*. Paris: Springer-Verlag.
- Bernardi, C., Y. Maday, and A. T. Patera (1994). A new nonconforming approach to domain decomposition: the mortar element method. In H. Brezis and J. Lions (Eds.), *Nonlinear Partial Differential Equations and Their Applications*, pp. 13–51. New York: Pitman and Wiley.
- Bernardi, F., J. Braunmiller, U. Kradolfer, and D. Giardini (2004). Automatic regional moment tensor inversion in the European-Mediterranean region. *Geophys. J. Int.* **157**, 703–716.
- Bernauer, M., A. Fichtner, and H. Igel (2009). Inferring earth structure from combined measurements of rotational and translational ground motions. *Geophysics* **74**, WCD41–WCD47.
- Bernauer, M., A. Fichtner, and H. Igel (2012). Measurements of translation, rotation and strain: New approaches to seismic processing and inversion. *J. Seismol.* **16**, 669–681.
- Bernauer, M., A. Fichtner, and H. Igel (2014a). Optimal observables for multi-parameter seismic tomography. *Geophys. J. Int.* **198**, 1241–1254.
- Bernauer, M., A. Fichtner, and H. Igel (2014b). Reducing non-uniqueness in finite-source inversion using rotational ground motion. *J. Geophys. Res.* **119**, doi:10.1029/2014JB011042.
- Bertholds, A. and R. Dändliker (1988). Determination of the individual strain-optic coefficients in single-mode optical fibers. *J. Lightwave Tech.* **6**, 17–20.
- Beskos, A., N. Pillai, G. Roberts, J. Sanz-Serna, and S. Andrews (2013). Optimal tuning of the hybrid Monte-Carlo algorithm. *Bernoulli* **19**, 1501–1534.
- Betancourt, M. (2017). A conceptual introduction to Hamiltonian Monte Carlo. *arXiv:1701.02434 [stat.ME]*.
- Betancourt, M., S. Byrne, and M. Girolami (2015). Optimizing the integrator step size for Hamiltonian Monte Carlo. *arXiv:1411.6669v2 [stat.ME]*.
- Bethier, E., H. Björnsson, F. Pálsson, K. L. Feigl, M. Llubes, and F. Rémy (2006). The level of the Grímsvötn subglacial lake, Vatnajökull, Iceland, monitored with SPOT5 images. *Earth Planet. Sci. Lett.* **243**, 293–302.
- Beyreuther, M., R. Barsch, L. Krischer, and J. Wassermann (2010). ObsPy: A Python toolbox for seismology. *Seis. Res. Lett.* **81**, 47–58.
- Bijwaard, H., W. Spakman, and E. R. Engdahl (1998). Closing the gap between regional and global traveltimes tomography. *J. Geophys. Res.* **103**, 30055–30078.
- Biondi, B. and A. Almomin (2014). Simultaneous inversion of full data bandwidth by tomographic full-waveform inversion. *Geophysics* **79**, WA129–WA140.
- Biondi, B., E. Martin, S. Cole, M. Karrenbach, and N. Lindsey (2017). Earthquake analysis using data recorded by the Stanford DAS array. *SEG Expanded Abstracts* **2017**, 2752–1756.
- Bird, P. (2003). An updated digital model of plate boundaries. *Geochem. Geophys. Geosys.* **4**, 1027–1079.
- Biryol, C. B., S. Beck, G. Zandt, and A. A. Ozacar (2011). Segmented African lithosphere beneath the Anatolian region inferred from teleseismic P-wave tomography. *Geophys. J. Int.* **184**, 1037–1057.
- Bishop, C. M. (2006). *Pattern recognition and machine learning*. Springer, New York.
- Biswas, R. and M. Sen (2017). 2D full-waveform inversion and uncertainty estimation using the reversible jump Hamiltonian Monte Carlo. *SEG Expanded Abstracts*, 1280–1285.
- Blackman, D. K. and J. M. Kendall (1997). Sensitivity of teleseismic body waves to mineral texture and melt in the mantle beneath a mid-ocean ridge. *Phil. Trans. R. Acad.* **355**, 217–231.
- Blakely, R. J. (1996). *Potential Theory in Gravity and Magnetic Applications*. Cambridge University Press, Cambridge, UK.
- Blanch, J. O., J. O. A. Robertsson, and W. W. Symes (1995). Modelling of a constant Q: Methodology and algorithm for an efficient and optimally inexpensive viscoelastic technique. *Geophysics* **60**, 176–184.
- Blanes, S., F. Casas, and J. M. Sanz-Serna (2014). Numerical integrators for the Hybrid Monte Carlo method. *SIAM J. Sci. Comp.* **36**, A1556–A1580.
- Bleibinhaus, F., J. A. Hole, and T. Ryberg (2007). Structure of the California Coast Ranges and San Andreas Fault at SAFOD from

- seismic waveform inversion and reflection imaging. *J. Geophys. Res.* **112**, doi:10.1029/2006JB004611.
- Bleibinhaus, F., R. W. Lester, and J. A. Hole (2009). Applying waveform inversion to wide-angle seismic surveys. *Tectonophysics* **472**, 238–248.
- Blom, N., C. Boehm, and A. Fichtner (2017). Synthetic inversions for density using seismic and gravity data. *Geophys. J. Int.* **209**, 1204–1220.
- Bodin, T., Y. Capdeville, B. Romanowicz, and J.-P. Montagner (2015). Interpreting radial anisotropy in global and regional tomographic models. In A. Khan and F. Deschamps (Eds.), *The Earth's heterogeneous mantle*, pp. 105–144. Springer.
- Bodin, T. and M. Sambridge (2009). Seismic tomography with the reversible jump algorithm. *Geophys. J. Int.* **178**, 1411–1436.
- Bodin, T., M. Sambridge, N. Rawlinson, and P. Arroucau (2012). Transdimensional tomography with unknown data noise. *Geophys. J. Int.* **189**, 1536–1556.
- Boehm, C. and A. Fichtner (2018). Lazy wave propagation. *Geophys. J. Int.* **216**, doi: 10.1093/gji/ggy295.
- Boehm, C., M. Hanzlich, J. de la Puente, and A. Fichtner (2016). Wavefield compression for adjoint methods in full-waveform inversion. *Geophysics* **81**, R385–R397.
- Boehm, C., N. Korta-Martiartu, N. Vinard, I. J. Balic, and A. Fichtner (2018). Time-domain spectral-element ultrasound waveform tomography using a stochastic quasi-Newton method. *SPIE Medical Imaging 2018*, 92 – 100.
- Bogey, C. and C. Bailly (2004). A family of low dispersive and low dissipative explicit schemes for flow and noise computations. *J. Comp. Phys.* **194**, 194–214.
- Bogris, A., C. Simos, I. Simos, T. Nikas, N. S. Melis, K. Lentas, C. Mesaritakis, I. Chochliouros, and C. Lessi (2021). Microwave frequency dissemination systems as sensitive and low-cost interferometers for earthquake detection on commercially deployed fiber cables. *arXiv:2111.02957 [physics.geo-ph]*.
- Bohlen, T. (2002). Parallel 3-D viscoelastic finite difference modelling. *Comput. Geosci.* **28**, 887–899.
- Bonnefoy-Claudet, S., F. Cotton, and P.-Y. Bard (2006). The nature of noise wavefield and its applications for site effects studies - A literature review. *Earth Sci. Rev.* **79**, 205–227.
- Boore, D. M. (1970). Love waves in nonuniform waveguides: finite difference calculations. *J. Geophys. Res.* **75**, 1512–1527.
- Boschi, L. (2003). Measures of resolution in global body wave tomography. *Geophys. Res. Lett.* **30**, doi:10.1029/2003GL018222.
- Boschi, L. and A. M. Dziewoński (2000). Whole Earth tomography for delay times of P, PcP and PKP phases: Lateral heterogeneities in the outer core or radial anisotropy in the mantle? *J. Geophys. Res.* **105**, 13675–13696.
- Boschi, L., G. Ekström, and B. Kustowski (2004). Multiple resolution surface wave tomography: the Mediterranean basin. *Geophys. J. Int.* **157**, 293–304.
- Boschi, L., F. Magrini, F. Cammarano, and M. van der Meijde (2019). On seismic ambient noise cross-correlation and surface-wave attenuation. *Geophys. J. Int.* **219**, 1568–1589.
- Boschi, L., C. Weemstra, J. Verbeke, G. Ekström, A. Zunino, and D. Giardini (2013). On measuring surface wave phase velocity from station-station cross-correlation of ambient signal. *Geophys. J. Int.* **192**, 346–358.
- Bouchon, M. (1979). Discrete wavenumber representation of elastic wave fields in three dimensions. *J. Geophys. Res.* **84**, 3609–3614.
- Boué, H. A. P. P. and P. Poli (2015). Arrival angle anomalies of Rayleigh waves observed at a broadband array: a systematic study based on earthquake data, full waveform simulations and noise correlations. *Geophys. J. Int.* **203**, 1626–1641.
- Boué, P., P. Poli, M. Campillo, H. Pedersen, X. Briand, and P. Roux (2013). Teleseismic correlations of ambient noise for deep global imaging of the Earth. *Geophys. J. Int.* **194**, 844–848.
- Bourguignon, S., H. Carfantan, and T. Böhm (2006). SparSpec: A new method for fitting multiple sinusoids with irregularly sampled data. *Astronomy and Astrophysics* **462**, doi:10.1051/0004-6361:20065452.
- Bowden, D. C., M. D. Kohler, V. C. Tsai, and D. S. Weeraratne (2016). Offshore Southern California lithospheric velocity structure from noise cross-correlation functions. *J. Geophys. Res.* **121**, 3415–3427.
- Bowden, D. C., K. Sager, A. Fichtner, and M. Chmiel (2020). Connecting beamforming and kernel-based noise source inversion. *Geophys. J. Int.*, under review.
- Bowden, D. C. and V. C. Tsai (2015). Site amplification, attenuation, and scattering from noise correlation amplitudes across a dense array in Long Beach, CA. *Geophys. Res. Lett.* **42**, doi:10.1002/2014GL062662.
- Bowden, D. C., V. C. Tsai, and F.-C. Lin (2017). Amplification and attenuation across USArray using ambient noise waveform tracking. *J. Geophys. Res.* **122**, doi:10.1002/2017JB014804.
- Bozdağ, E., D. Peter, M. Lefebvre, D. Komatitsch, J. Tromp, J. Hill, N. Podhorszki, and D. Pugmire (2016). Global adjoint tomography: First-generation model. *Geophys. J. Int.* **207**, 1739–1766.
- Bozdağ, E. and J. Trampert (2008). On crustal corrections in surface wave tomography. *Geophys. J. Int.* **172**, 1066–1082.
- Bozdağ, E., J. Trampert, and J. Tromp (2011). Misfit functions for full waveform inversion based on instantaneous phase and envelope measurements. *Geophys. J. Int.* **185**, 845–870.
- Bozkurt, E. (2001). Neotectonics of Turkey - a synthesis. *Geodyn. Acta* **14**, 3–30.
- Bréger, L. and B. Romanowicz (1998). Thermal and chemical 3d heterogeneity in d". *Science* **282**, 718–720.
- Bréger, L., B. Romanowicz, and L. Vinnik (1998). Tests of tomographic models in d" using differential travel times. *Geophys. Res. Lett.* **25**, 5–8.
- Brenders, A. J. and R. G. Pratt (2007). Full waveform tomography for lithospheric imaging: results from a blind test in a realistic crustal model. *Geophys. J. Int.* **168**, 133–151.
- Brenguier, F., M. Campillo, C. Haziioannou, N. M. Shapiro, R. M. Nadeau, and E. Larose (2008). Postseismic relaxation along the San Andreas fault at Parkfield from continuous seismological observations. *Science* **321**, 1478–1481.
- Brenguier, F., N. M. Shapiro, M. Campillo, V. Ferrazzini, Z. Duputel, O. Coutant, and A. Nercessian (2008). Towards forecasting volcanic eruptions using seismic noise. *Nat. Geosci.* **1**, 126–130.
- Brewster, M. E. and G. Beylkin (1995). A multiresolution strategy for numerical homogenization. *Appl. Comp. Harm. Analysis* **2**, 327–349.

- Briand, X., M. Campillo, F. Brenguier, P. Boué, P. Poli, P. Roux, and T. Takeda (2013). Processing of terabytes of data for seismic noise analysis with the Python codes of the Whisper Suite. *AGU Fall Meeting Abstracts* **IN51B-1544**.
- Brocher, T. M. (2005). Empirical relations between elastic wavespeeds and density in the Earth's crust. *Bull. Seis. Soc. Am.* **95**(6), 2081–2092.
- Bromirski, P. D., Z. Chen, R. A. Stephen, P. Gerstoft, D. Arcas, A. Diez, R. C. Aster, D. A. Wiens, and A. Nyblade (2017). Tsunami and infragravity waves impacting Antarctic ice shelves. *J. Geophys. Res.* **122**, 5786–5801.
- Broodlie, K. W., A. R. Gourlay, and J. Greenstadt (1973). Rank-one and rank-two corrections to positive definite matrices expressed in product form. *J. Inst. Maths. Applics.* **11**, 73–82.
- Brossier, R., S. Operto, and J. Virieux (2009a). Robust elastic frequency-domain full waveform inversion using the  $l_1$  norm. *Geophys. Res. Lett.* **36**, L20310.
- Brossier, R., S. Operto, and J. Virieux (2009b). Seismic imaging of complex onshore structures by 2D elastic frequency-domain full-waveform inversion. *Geophysics* **74**, WCC105–WCC118.
- Brossier, R., S. Operto, and J. Virieux (2010). Which data residual norm for robust elastic frequency-domain full waveform inversion? *Geophysics* **75**, R37–R46.
- Broyden, C. G. (1970). The convergence of a class of double-rank minimization algorithms. *J. Inst. Math. Appl.* **6**, 76–90.
- Bube, K. P. and R. Burridge (1983). The one-dimensional inverse problem of reflection seismology. *SIAM Review* **25**, 497–559.
- Bucher, R. and D. Misra (2002). A synthesizable VHDL model for the exact solution for three-dimensional hyperbolic positioning system. *VLSI Design* **15**, 507–520.
- Bui-Thanh, T. and O. Ghattas (2012). A scaled stochastic Newton algorithm for Markov Chain Monte Carlo simulations. *SIAM J. Uncert. Quant.*, 1–25.
- Bui-Thanh, T., O. Ghattas, J. Martin, and G. Stadler (2013). A computational framework for infinite-dimensional Bayesian inverse problems part I: The linearized case, with application to global seismic inversion. *SIAM J. Sci. Comp.* **35**, A2494–A2523.
- Buland, R. and F. Gilbert (1976). Matched filtering for the seismic moment tensor. *Geophys. Res. Lett.* **3**, 205–206.
- Bullen, K. E. (1963). *An Introduction to the theory of seismology*. Cambridge University Press, Cambridge.
- Bunge, H.-P., C. R. Hagelberg, and B. J. Travis (2003). Mantle circulation models with variational data assimilation: Inferring past mantle flow and structure from plate motion histories and seismic tomography. *Geophys. J. Int.* **152**, 280–301.
- Bunks, C., F. M. Saleck, S. Zaleski, and G. Chavent (1995). Multiscale seismic waveform inversion. *Geophysics* **60**, 1457–1473.
- Burridge, R. (1980). The Gelfand-Levitan, the Marchenko, and the Gopinath-Sondhi integral equations of inverse scattering theory, regarded in the context of inverse impulse-response problems. *Wave Motion* **2**, 305–323.
- Burridge, R. and L. Knopoff (1964). Body force equivalents for seismic dislocations. *Bull. Seis. Soc. Am.* **54**, 1875–1888.
- Buselmaier, W. and J. Haussig (2018). *Biologie für Mediziner*. Springer-Verlag.
- Bussat, S. and S. Kugler (2011). Offshore ambient-noise surface-wave tomography above 0.1 Hz and its applications. *The Leading Edge* **May 2011**, 514–524.
- Butter, C. and G. Hocker (1978). Fiber optics strain gauge. *Appl. Opt.* **17**, 2867–2869.
- Calderhead, B. and M. A. Sustik (2012). Sparse approximate manifolds for differential geometric MCMC. *Adv. Neural Inf. Proc. Sys.* **25**, 2879–2887.
- Cammarano, F., S. Goes, P. Vacher, and D. Giardini (2003). Inferring upper-mantle temperatures from seismic velocities. *Phys. Earth Planet. Int.* **138**, 197–222.
- Campbell, I. H. and A. C. Kerr (2007). The great plume debate: Testing the plume theory. *Chem. Geol.* **241**, 149–152.
- Campillo, M. and A. Paul (2003). Long-range correlations in the diffuse coda. *Science* **299**, 547–549.
- Canas, J. A. and B. J. Mitchell (1978). Lateral variations of surface wave attenuation across the Pacific. *Bull. Seis. Soc. Am.* **68**, 1637–1650.
- Cance, P. and Y. Capdeville (2015). Validity of the acoustic approximation for elastic waves in heterogeneous media. *Geophysics* **80**, T161–T173.
- Capdeville, Y. (2000). *Méthode couplée éléments spectraux – solution modale pour la propagation d'ondes dans la Terre à l'échelle globale*. Ph. D. thesis, Université Paris 7.
- Capdeville, Y. (2005). An efficient Born normal mode method to compute sensitivity kernels and synthetic seismograms in the Earth. *Geophys. J. Int.* **163**, 639–554.
- Capdeville, Y. (2010). *Contributions aux problèmes direct et inverse en sismologie*. Ph. D. thesis, Université Paris 7.
- Capdeville, Y., E. Chaljub, J. Vilotte, and J. Montagner (1999, November). A hybrid numerical method of the spectral element method and the normal modes for realistic 3D wave propagation in the Earth. In *AGU 1999 Fall meeting*, Volume 80 of *EOS Supplement*, pp. 698. AGU.
- Capdeville, Y., E. Chaljub, J.-P. Vilotte, and J.-P. Montagner (2003). Coupling the Spectral Element Method with a modal solution for Elastic Wave Propagation in Global Earth Models. *Geophys. J. Int.* **152**, 34–66.
- Capdeville, Y., P. Cupillard, and S. Singh (2020). An introduction to the two-scale homogenization method for seismology. In B. Moseley and L. Krischer (Eds.), *Machine Learning in Geosciences*, Volume 61 of *Advances in Geophysics*, pp. 217–306. Elsevier.
- Capdeville, Y., L. Guillot, and J. J. Marigo (2010a). 1-D non periodic homogenization for the wave equation. *Geophys. J. Int.* **181**, 897–910.
- Capdeville, Y., L. Guillot, and J. J. Marigo (2010b). 2-D nonperiodic homogenization to upscale elastic media for P-SV waves. *Geophys. J. Int.* **182**, 903–922.
- Capdeville, Y., Y. Gung, and B. Romanowicz (2002). The Coupled Spectral Element/Normal Mode Method: Application to the testing of several approximations based on normal mode theory for the computation of seismograms in a realistic 3D Earth. In *Eos Trans.*, Volume 83(47) of *Fall Meeting Supplement*. AGU. Abstract S51C-10.
- Capdeville, Y., Y. Gung, and B. Romanowicz (2005). Towards global earth tomography using the spectral element method:

- a technique based on source stacking. *Geophys. J. Int.* **162**, 541–554.
- Capdeville, Y., C. Larmat, J. P. Vilotte, and J. P. Montagner (2002). Direct numerical simulation of the scattering induced by a localized plume like using a coupled spectral element and modal solution. *Geophys. Res. Lett.* **29**, No. 9, 10.1029/2001GL013747.
- Capdeville, Y. and J. J. Marigo (2007). Second order homogenization of the elastic wave equation for non-periodic layered media. *Geophys. J. Int.* **170**, 823–838.
- Capdeville, Y. and J. J. Marigo (2008). Shallow layer correction for spectral element like methods. *Geophys. J. Int.* **172**, 1135–1150.
- Capdeville, Y. and J.-J. Marigo (2013). A non-periodic two-scale asymptotic method to take account of rough topographies for 2-D elastic wave propagation. *Geophys. J. Int.* **192**, 163–189.
- Capdeville, Y. and L. Métivier (2018). Elastic full waveform inversion based on the homogenization method: theoretical framework and 2-D numerical illustrations. *Geophys. J. Int.* **213**, 1093–1112.
- Capdeville, Y., B. Romanowicz, and A. To (2003). Coupling spectral elements and modes in a spherical earth: an extension to the “sandwich” case. *Geophys. J. Int.* **154**, 44–57.
- Capdeville, Y., E. Stutzmann, and J. P. Montagner (1997). Effect of mantle plume on surface waves and normal modes. In *IASPEI 1997, Thessaloniki, Greece, Abstracts*, pp. 245.
- Capdeville, Y., E. Stutzmann, and J. P. Montagner (2000). Effect of a plume on long period surface waves computed with normal modes coupling. *Phys. Earth Planet. Inter.* **119**, 57–74.
- Capdeville, Y., E. Stutzmann, J.-P. Montagner, and N. Wang (2013a). Residual homogenization for seismic forward and inverse problems in layered media. *Geophys. J. Int.* **194**, 470–487.
- Capdeville, Y., E. Stutzmann, J.-P. Montagner, and N. Wang (2013b). Residual homogenization for seismic forward and inverse problems in layered media. *Geophys. J. Int.* **194**, 470–487.
- Cara, M., J. J. Lévêque, and V. Maupin (1984). Density-versus-depth models from multimode surface waves. *Geophys. Res. Lett.* **11**, 633–636.
- Carcione, J. (1992). Anisotropic Q and velocity dispersion of finely layered media. *Geophys. Prosp.* **40**, 40.
- Carcione, J. and P. Wang (1993). A Chebyshev collocation method for the wave equation in generalized coordinates. *Comp. Fluid. Dyn. J.* **2**, 269–290.
- Carcione, J. M., D. Kosloff, and R. Kosloff (1988a). Wave propagation simulation in a linear viscoacoustic medium. *Geophys. J.* **93**, 393–407.
- Carcione, J. M., D. Kosloff, and R. Kosloff (1988b). Wave propagation simulation in a linear viscoelastic medium. *Geophys. J.* **95**, 597–611.
- Cazenave, A., A. Souriau, and K. Dominh (1989). Global coupling of Earth surface topography with hotspots, geoid and mantle heterogeneities. *NAT* **340**, 54–57.
- Çubuk Sabuncu, Y., T. Taymaz, and A. Fichtner (2017). 3-D crustal velocity structure of western Turkey: Constraints from full-waveform tomography. *Phys. Earth Planet. Int.* **270**, 90–112.
- Cerjan, C., D. Kosloff, R. Kosloff, and M. Reshef (1985). A non-reflecting boundary condition for discrete acoustic and elastic wave equations. *Geophysics* **50**, 705–708.
- Cerveny, V. (2001). *Seismic ray theory*. Cambridge University Press.
- Cesca, S., S. Heimann, K. Stammler, and T. Dahm (2010). Automated procedure for point and kinematic source inversion at regional distances. *J. Geophys. Res.* **115**, doi:10.1029/2009JB006450.
- Chaljub, E. (2000). *Modélisation numérique de la propagation d'ondes sismiques à l'échelle du globe*. Thèse de doctorat de l'Université Paris 7.
- Chaljub, E., Y. Capdeville, and J. Vilotte (2003). Solving elastodynamics in a solid heterogeneous 3-Sphere: a spectral element approximation on geometrically non-conforming grids. *J. Comp. Physics* **183**, 457–491.
- Chaljub, E., Y. Capdeville, J.-P. Vilotte, and Y. Maday (2001). Solving elastodynamics in a solid heterogeneous 3-sphere: a spectral element approximation using non-conforming grids. *Int. J. Num. Meth. Engng.* submitted.
- Chaljub, E. and A. Tarantola (1997). Sensitivity of SS precursor to topography on the upper–mantle 660-km discontinuity. *Geophys. Res. Lett.* **24**, 2613–2616.
- Chang, S.-J., S. van der Lee, M. P. Flanagan, H. Bedle, F. Marone, E. M. Matzel, M. E. Pasyanos, A. J. Rodgers, B. Romanowicz, and C. Schmid (2010). Joint inversion for three-dimensional S velocity mantle structure along the Tethyan margin. *J. Geophys. Res.* **115**, doi:10.1029/2009JB007204.
- Chapman, C. (1978). A new method for computing synthetic seismograms. *Geophys. J. R. Astron. Soc.* **54**, 481–518.
- Chapman, C. H. and W. S. Leaney (2012). A new moment-tensor decomposition for seismic events in anisotropic media. *Geophys. J. Int.* **188**, 343–370.
- Charlier, C. V. L. (1905). Über die Darstellung willkürlicher Funktionen. *Arkiv för Matematik, Astronomi och Fysik* **20(2)**, 1–35.
- Chastel, Y. B. and P. R. Dawson (1993). Anisotropy convection with implications for the upper mantle. *J. Geophys. Res.* **98**, 17757–17771.
- Chavent, G., M. Dupuy, and P. Lemonnier (1975). History matching by use of optimal theory. *J. Soc. Petr. Eng.* **15**, 74–86.
- Chavent, G. and R.-E. Plessix (1999). An optimal true-amplitude least-squares prestack depth-migration operator. *Geophysics* **64**, 508–515.
- Chen, M., F. Niu, Q. Liu, J. Tromp, and X. Zheng (2015). Multi-parameter adjoint tomography of the crust and upper mantle beneath East Asia - Part I: Model construction and comparisons. *J. Geophys. Res.* **120**, 1762–1786.
- Chen, P. (2011). Full-wave seismic data assimilation: Theoretical background and recent advances. *Pure Appl. Geophys.* **168**, 1527–1552.
- Chen, P., T. H. Jordan, and L. Zhao (2007). Full 3D waveform tomography: a comparison between the scattering-integral and adjoint-wavefield methods. *Geophys. J. Int.* **170**, 175–181.
- Chen, P., L. Zhao, and T. H. Jordan (2007). Full 3D tomography for the crustal structure of the Los Angeles region. *Bull. Seismol. Soc. Am.* **97**, 1094–1120.
- Cheng, H.-X. and B. L. N. Kennett (2002). Frequency dependence of seismic wave attenuation in the upper mantle beneath the Australian region. *Geophys. J. Int.*, 45–57.
- Chevalier, C. and F. Pellegrini (2008). Pt-scotch: a tool for efficient parallel graph ordering. *Parallel Comp.* **34**, 318–313.

- Chevrot, S., J. Montagner, and R. Sneider (1998a). Corrigendum, "The spectrum of tomographic models. *Geophys. J. Int.* **135**, 311.
- Chevrot, S., J. Montagner, and R. Sneider (1998b). The spectrum of tomographic earth models. *Geophys. J. Int.* **133**, 733–788.
- Chevrot, S. and L. Zhao (2007). Multiscale finite-frequency Rayleigh wave tomography of the Kaapvaal craton. *Geophys. J. Int.* **169**, 201–215.
- Chew, W. C. and J. H. Lin (1995). A frequency-hopping approach for microwave imaging of large inhomogeneous bodies. *IEEE Microwave and Guided Wave Letters* **5**, 439–441.
- Chib, S. and E. Greenberg (1995). Understanding the Metropolis-Hastings algorithm. *American Statistician* **49**, 327–335.
- Chib, S., E. Greenberg, and R. Winkelmann (1998). Posterior simulation and Bayes factors in panel count data models. *J. Economet.* **86**, 33–54.
- Chou, C. W. and J. R. Booker (1979). A Backus-Gilbert approach to inversion of travel-time data for three-dimensional velocity structure. *Geophys. J. R. astr. Soc.*, 325–344.
- Chouet, B. A. (1996). Long-period volcano seismicity: its source and use in eruption forecasting. *Nature* **380**, 309–315.
- Christensen, N. I. and W. D. Mooney (1995). Seismic velocity structure and composition of the continental crust: a global view. *J. Geophys. Res.* **100**, 9761–9788.
- Chulliat, A., J. Matzka, A. Masson, and S. E. Milan (2017). Key ground-based and space-based assets to disentangle magnetic field sources in the Earth's environment. *Space Sci. Rev.* **206**, 123–156.
- Claerbout, J. F. (1968). Synthesis of a layered medium from its acoustic transmission response. *Geophysics* **33**, 264–269.
- Clayton, R. and B. Engquist (1977). Absorbing boundary conditions for acoustic and elastic wave equations. *Bull. Seismol. Soc. Am.* **67**, 1529–1540.
- Clayton, R. W. (2015). Lost hills node arrays. doi:10.7909/ycnz-5s81, <http://web.gps.caltech.edu/clay/LostHills/LostHills.html>.
- Cleary, J. (1974). The D" region. *Phys. Earth Planet. Inter.* **9**, 13–27.
- Clévéde, E. (1991). Modes propres d'une Terre sphérique anélastique. Rapport de stage de DEA. IPGP.
- Clévéde, E. and P. Lognonné (1996). Fréchet derivatives of coupled seismograms with an anelastic rotating earth. *Geophys. J. Int.* **124**, 456–482.
- Clévéde, E., C. Mégnin, B. Romanowicz, and P. Lognonné (2000). Seismic waveform modeling and surface wave tomography in a three-dimensional earth: asymptotic and non-asymptotic approaches. *Phys. Earth Planet. Inter.* **119**, 37–56.
- Cobden, L. J., C. H. Tong, and M. R. Warner (2010). Influence of acoustic source density on cross-correlated signals: Implications for amplitude-based tomography in helioseismology. *Astrophys. J. Lett.* **725**, 313–318.
- Cohen-Tannoudji, C., B. Diu, and F. Laloë (1977). *Mécanique Quantique*. Hermann, Paris, and John Wiley and Sons, New York.
- Cole, S. P. (1995). *Passive seismic and dribb-bit experiments using 2-D arrays*. Ph. D. thesis, The Stanford Exploration Project, Stanford University.
- Colli, L., A. Fichtner, and H.-P. Bunge (2013). Full waveform tomography of the upper mantle in the South Atlantic region: Imaging westward fluxing shallow asthenosphere? *Tectonophysics* **604**, 26–40.
- Colli, L., S. Ghelichkhan, and H.-P. Bunge (2017). Retrodictions of Mid Paleogene mantle flow and dynamic topography in the Atlantic region from compressible high resolution adjoint mantle convection models: Sensitivity to deep mantle viscosity and tomographic input model. *Gondwana Res.* **53**, doi:10.1016/j.gr.2017.04.027.
- Connolly, J. (2005). Computation of phase equilibria by linear programming: a tool for geodynamic modelling and its application to subduction zone decarbonation. *Earth Planet. Sci. Lett.* **2361**, 524–541.
- Cormack, A. M. (1963). Representation of a function by its line integrals, with some radiological applications. *J. Appl. Phys.* **34**, 2722–2727.
- Cotton, F. and M. Campillo (1995). Frequency-domain inversion of strong ground motions: Application to the 1992 Landers earthquake. *J. Geophys. Res.* **100**, 3961–3975.
- Courtillot, V., A. Davaille, J. Besse, and J. Stock (2003). Three distinct types of hotspots in the Earth's mantle. *Earth Planet. Sci. Lett.* **205:3-4**, 295–308.
- Cowles, M. K. and B. P. Carlin (1996). Markov chain monte carlo convergence diagnostics: A comparative review. *J. Am. Stat. Ass.* **91**, 883–904.
- Cramér, H. (1957). *Mathematical methods of statistics*. Princeton University Press.
- Crampin, S. and S. Chastin (2003). A review of shear wave splitting in the crack-critical crust. *Geophys. J. Int.* **155**, 221–240.
- Crank, J. and P. Nicolson (1947). A practical method for numerical evaluation of solutions of partial differential equations of the heat conduction type. *Proc. Camb. Phil. Soc.* **43**, 50–67.
- Crary, A. P. (1954). Seismic studies on Fletcher's Ice Island, T-3. *Trans. Am. Geophys. Union* **35**, 293–300.
- Cruse, E., A. Pica, M. Noble, J. McDonald, and A. Tarantola (1990). Robust elastic nonlinear waveform inversion - Application to real data. *Geophysics* **55**, 527–538.
- Creager, K. C. (1992). Anisotropy of the inner core from differential travel times of the phases PKP and PKIKP. *Nature* **356**, 309–314.
- Creager, K. C. (1997). Inner core rotation rate from small-scale heterogeneity and time-varying travel times. *Science* **278**, 1284–1288.
- Creutz, M. (1988). Global monte carlo algorithms for many-fermion systems. *Physical Review D* **38(4)**, 1228–1238.
- Crotwell, H. P., T. J. Owens, and J. Ritsema (1999). The TauP toolkit: flexible seismic travel-time and ray-path utilities. *Seis. Res. Lett.* **70(2)**, 154–160.
- Şengör, A. M. C., O. Tüysüz, C. İmren, M. Sakıncı, H. Eyidoğan, N. Görür, X. Le Pichon, and C. Rangin (2005). The North Anatolian Fault: A new look. *Ann. Rev. Earth Planet. Sci.* **33**, 37–112.
- Cummins, P. (1992). Seismic body waves in a 3d, slightly aspherical Earth: I. Testing the Born approximation. *Geophys. J. Int.* **109**, 391–410.
- Cummins, P., R. Geller, T. Haori, and N. Takeuchi (1994). DSM complete synthetic seismograms: SH, spherically symmetric case. *Geophys. Res. Lett.* **21**, 533–536.

- Cummins, P., R. Geller, and N. Takeuchi (1994). DSM complete synthetic seismograms: P-SV, spherically symmetric case. *Geophys. Res. Lett.* **21**, 1663–1666.
- Cummins, P. R., N. Takeuchi, and R. J. Geller (1997). Computation of complete synthetic seismograms for laterally heterogeneous models using the Direct Solution Method. *Geophys. J. Int.* **130**, 1–16.
- Cupillard, P. (2008). *Simulation par la méthode des éléments spectraux des formes d'onde obtenues par corrélation de bruit sismique*. Phd thesis, Institut de Physique du Globe de Paris.
- Cupillard, P. and Y. Capdeville (2010). On the amplitude of surface waves obtained by noise correlation and the capability to recover the attenuation: a numerical approach. *Geophys. J. Int.* **181**, 1687–1700.
- Cupillard, P. and Y. Capdeville (2018). Non-periodic homogenization of 3-D elastic media for the seismic wave equation. *Geophys. J. Int.* **213**, 983–1001.
- Cupillard, P., E. Delavaud, G. Burgos, G. Festa, J.-P. Vilotte, Y. Capdeville, and J.-P. Montagner (2012). RegSEM: a versatile code based on the spectral element method to compute seismic wave propagation at the regional scale. *Geophys. J. Int.* **188**, 1203–1220.
- Cupillard, P., L. Stehly, and B. Romanowicz (2011). The one-bit noise correlation: a theory based on the concepts of coherent and incoherent noise. *Geophys. J. Int.* **184**, 1397–1414.
- Currenti, G., C. Del Negro, G. Ganci, and C. A. Williams (2008). Static stress changes induced by the magmatic intrusions during the 2002-2003 Etna eruption. *J. Geophys. Res.* **113**, doi:10.1029/2007JB005301.
- Currenti, G., P. Jousset, R. Napoli, C. Krawczyk, and M. Weber (2021). On the comparison of strain measurements from fibre optics with a dense seismometer array at Etna volcano (Italy). *Solid Earth* **12**, doi:10.5194/se-12-993-2021.
- Curry, W. (2008). *Interpolation with prediction-error filters and training data*. Phd thesis, Stanford University.
- Curtis, A. (1999a). Optimal design of focused experiments and surveys. *Geophys. J. Int.* **139**, 205–215.
- Curtis, A. (1999b). Optimal experimental design: cross-borehole tomographic examples. *Geophys. J. Int.* **136**, 637–650.
- Curtis, A. and D. Halliday (2010). Directional balancing for seismic and general wavefield interferometry. *Geophysics* **75**, doi: 10.1190/1.3298736.
- Curtis, A. and H. Maurer (2000). Optimizing the design of geophysical experiments: Is it worthwhile? *The Leading Edge* **19**, 1058–1062.
- Dablain, M. (1986). The application of high-order differencing to the scalar wave equation. *Geophysics* **51**, 54–66.
- Dahlen, F. (1968). The normal modes of a rotating elliptical Earth. *Geophys. J. R. Astr. Soc.* **16**, 329–367.
- Dahlen, F. (1969). The normal modes of a rotating elliptical Earth. *Geophys. J. R. Astr. Soc.* **18**, 397–436.
- Dahlen, F. (1972). Elastic dislocation theory for a self-gravitating elastic configuration with an initial stress field. *Geophys. J. R. Astr. Soc.* **28**, 357–383.
- Dahlen, F. (1973). Elastic dislocation theory for a self-gravitating elastic configuration with an initial static stress field; II, Energy release. *Geophys. J. R. Astr. Soc.* **31**, 469–483.
- Dahlen, F., S.-H. Hung, and G. Nolet (2000). Fréchet kernels for finite-frequency traveltimes – I. Theory. *Geophys. J. Int.* **141**, 157–174.
- Dahlen, F. A. and F. A. Baig (2002). Fréchet kernels for body wave amplitudes. *Geophys. J. Int.* **150**, 440–466.
- Dahlen, F. A. and J. Tromp (1998). *Theoretical Global Seismology*. Princeton University Press. NJ.
- Dahlen, T. (1987). Multiplet coupling and the calculation of synthetic long-period seismograms. *Geophys. J. R. Astr. Soc.* **91**, 241–254.
- Dahlin, J., F. Lindsten, and T. B. Schön (2015). Quasi-newton particle metropolis-hastings. *IFAC Papers Online*, 981–986.
- Dal Moro, G. and M. Pipan (2006). Joint inversion of surface wave dispersion curves and reflection travel times via multi-objective evolutionary algorithms. *J. Appl. Geophys.* **61**, 56–81.
- Daley, T. M., D. E. Miller, K. Dodds, P. Cook, and B. M. Freifeld (2016). Field testing of modular borehole monitoring with simultaneous distributed acoustic sensing and geophone vertical seismic profiles at Citronelle, Alabama. *Geophys. Prosp.* **64**, 1318–1334.
- Daley, T. M., R. Pevzner, V. Shulakova, S. Kashikar, D. E. Miller, J. Goetz, and J. H. ans S. Lueth (2013). Field testing of fiber-optic distributed acoustic sensing (DAS) for subsurface seismic monitoring. *The Leading Edge* **June 2013**, 936–942.
- Daley, T. M., D. White, D. E. Miller, M. Robertson, B. Freifeld, F. Herkenhoff, and J. Cocker (2014). Simultaneous acquisition of distributed acoustic sensing VSP with multi-mode and single-mode optical cables and 3-component geophones at the Aquistore CO<sub>2</sub> storage site. *SEG Extended Abstract* **2014**, 5014–5018.
- Dalton, C. A., G. Ekström, and A. M. Dziewonski (2008). The global attenuation structure of the upper mantle. *J. Geophys. Res.* **113**, doi:10.1029/2007JB005429.
- Danecek, P., D. Stich, and A. Morelli (2011). Images of the Iberian lithosphere from one local earthquake. *Bull. Seis. Soc. Am.* **101**, 881–887.
- Daskalakis, E., C. P. Evangelidis, J. Garnier, N. S. Melis, G. Papanicolaou, and C. Tsogka (2016). Robust seismic velocity change estimation using ambient noise recordings. *Geophys. J. Int.*, in press.
- Datta, A., S. Hanasoge, and J. Goudswaard (2019). Finite-frequency inversion of cross-correlation amplitudes for ambient noise source directivity estimation. *J. Geophys. Res.* **124**, 6653–6665.
- Davies, G. F. (1999). *Dynamic Earth*. Cambridge University Press.
- de Kool, M., N. Rawlinson, and M. Sambridge (2006). A practical grid-based method for tracking multiple refraction and reflection phases in three-dimensional heterogeneous media. *Geophys. J. Int.* **167**(1), 253–270.
- de la Puente, J., M. Dumbser, M. Käser, and H. Igel (2007). An arbitrary high-order discontinuous Galerkin method for elastic waves on unstructured methods - IV. Anisotropy. *Geophys. J. Int.* **169**, 1210–1228.
- De Martino, S., M. Falanga, R. Scarpa, and C. Godano (2005). Very-long-period volcanic tremor at Stromboli, Italy. *Bulletin of the Seismological Society of America* **95**(3), 1186–1192.
- de Ridder, S. A. L. and B. L. Biondi (2015). Ambient seismic noise tomography at Ekofisk. *Geophysics* **80**, B167–B176.

- de Ridder, S. A. L., B. L. Biondi, and R. G. Clapp (2014). Time-lapse seismic noise correlation tomography at Valhall. *Geophys. Res. Lett.* **41**, 6116–6122.
- de Vogelaere, R. (1956). Methods of integration which preserve the contact transformation property of Hamiltonian equations. Technical Report Report No. 4, Department of Mathematics, University of Notre Dame, Notre Dame, Ind., USA.
- de Vos, D., H. Paulssen, and A. Fichtner (2013). Finite-frequency sensitivity kernels for two-station surface wave measurements. *Geophys. J. Int.* **194**, 1042–1049.
- de Wit, R. W. L., J. Trampert, and R. D. van der Hilst (2012). Toward quantifying uncertainty in travel time tomography using the null-space shuttle. *J. Geophys. Res.* **117**, doi:10.1029/2011JB008754.
- de Wit, R. W. L., A. Valentine, and J. Trampert (2013). Bayesian inference of Earth's radial seismic structure from body-wave travel times using neural networks. *Geophys. J. Int.* **195**, 408–422.
- Deal, M. M. and G. Nolet (1996). Nullspace shuttles. *Geophys. J. Int.* **124**, 372–380.
- Dean, T., T. Brice, A. Hartog, E. Kragh, D. Molteni, and K. O'Connell (1996). Distributed vibration sensing for seismic acquisition. *The Leading Edge* **July 2016**, 600–604.
- Debayle, E., F. Dubuffet, and S. Durand (2016). An automatically updated S-wave model of the upper mantle and the depth extent of azimuthal anisotropy. *Geophys. Res. Lett.* **43**, 674–682.
- Debayle, E. and B. L. N. Kennett (2000). Anisotropy in the Australasian upper mantle from Love and Rayleigh waveform inversion. *Earth Planet. Sci. Lett.* **184**, 339–351.
- Debayle, E. and Y. Ricard (2013). Seismic observations of large-scale deformation at the bottom of fast-moving plates. *Earth Planet. Sci. Lett.*, in press.
- Debayle, E. and M. Sambridge (2004). Inversion of massive surface wave data sets: Model construction and resolution assessment. *J. Geophys. Res.* **109**, doi:10.1029/2003JB002652.
- Del Brio, E. B., T. M. Niguez, and J. Perote (2009). Gram-Charlier densities: a multivariate approach. *Quantitative Finance* **9**, 855–868.
- Delaney, E., L. Ermert, K. Sager, A. Kritski, S. Bussat, and A. Fichtner (2017). Passive seismic monitoring with nonstationary noise sources. *Geophysics* **82**, KS57–KS70.
- DeMets, C., R. G. Gordon, D. F. Argus, and S. Stein (1994). Effect of recent revisions to the geomagnetic reversal time scale on estimates of current plate motions. *Geophys. Res. Lett.* **21**, 2192–2194.
- Denolle, M. A., E. M. Dunham, G. A. Prieto, and G. C. Beroza (2013). Ground motion prediction of realistic earthquake sources using the ambient seismic field. *J. Geophys. Res.* **118**, doi:10.1029/2012JB009603.
- Denolle, M. A., E. M. Dunham, G. A. Prieto, and G. C. Beroza (2014). Strong ground motion prediction using virtual earthquakes. *Science* **343**, 399–403.
- Deschamps, F., L. Cobden, and P. J. Tackley (2012). The primitive nature of large low shear-wave velocity provinces. *Earth Planet. Sci. Lett.* **349–350**, 198–208.
- Dessa, J. X., S. Operto, S. Kodaira, A. Nakanishi, G. Pascal, J. Virieux, and Y. Kaneda (2004). Multiscale seismic imaging of the eastern Nankai trough by full waveform inversion. *Geophys. Res. Lett.* **31**, doi:10.1029/2004GL020453.
- Dessa, J.-X. and G. Pascal (2003). Combined traveltimes and frequency-domain seismic waveform inversion: a case study on multi-offset ultrasonic data. *Geophys. J. Int.* **154**(1), 117–133.
- Deuss, A. (2008). Normal-mode constraints on shear and compressional wave velocity of the Earth's inner core. *Earth Planet. Sci. Lett.* **268**, 364–375.
- Deuss, A. and J. H. Woodhouse (2001). Theoretical free-oscillation spectra: the importance of wide band coupling. *Geophys. J. Int.* **146**, 833–842.
- Devaney, A. J. (1984). Geophysical diffraction tomography. *IEEE Transactions on Geoscience and Remote Sensing* **22**, 3–13.
- Devilee, R. J. R., A. Curtis, and K. Roy-Chowdhury (1999). An efficient, probabilistic neural network approach to solving inverse problems: Inverting surface wave velocities for Eurasian crustal thickness. *J. Geophys. Res.* **104**, 28841–28857.
- Díaz, E. and A. Guitton.
- Díaz, J., A. Villaseñor, J. Gallart, J. Morales, A. Pazos, D. Córdoba, J. Pulgar, J. L. García-Lobón, M. Harnafi, and TopoIberia Seismic Working Group (2009). The IBERARRAY broadband seismic network: A new tool to investigate the deep structure beneath Iberia. *ORFEUS Newsletter* **8**, 1–6.
- Diaz-Steptoe, H. (2013). *Full seismic waveform tomography of the Japan region using adjoint methods*. Master thesis, Utrecht University.
- Ding, X. and D. Helmberger (1997). Modeling D" structure beneath Central America with broadband seismic data. *Phys. Earth. Planet. Int.* **101**, 245–270.
- Dondi, F., A. Betti, G. Blo, and C. Bigli (1981). Statistical analysis of gas-chromatographic peaks by the Gram-Charlier series of type A and the Edgeworth-Cramer series. *Analytical Chemistry* **53**, 496–504.
- Donner, S., M. Bernauer, and H. Igel (2016). Inversion for seismic moment tensors combining translational and rotational ground motions. *Geophys. J. Int.* **207**, 562–570.
- Dorobantu, M. and B. Engquist (1998). Wavelet-based numerical homogenization. *SIAM J. Num. Analysis* **35**, 540–559.
- Drewry, D. J., S. R. Jordan, and E. Jankowski (1982). Measured properties of the Antarctic ice sheet: surface configuration, ice thickness, volume and bedrock characteristics. *Annals of Glaciology* **3**, 83–91.
- Drineas, P., R. Kannan, and M. W. Mahoney (2006). Fast Monte Carlo algorithms for matrices II: Computing a low-rank approximation to a matrix. *SIAM J. Comput.* **36**, 158–183.
- Drugan, W. J. and J. R. Willis (1995). A micromechanics-based nonlocal constitutive equation and estimates of representative volume element size for elastic composites. *J. Mech. Phys. Solids* **44**, 497–524.
- Duane, S., A. D. Kennedy, B. J. Pendleton, and D. Roweth (1987). Hybrid Monte Carlo. *Phys. Lett. B* **195**, 216–222.
- Dubbledam, D., S. Calero, D. E. Ellis, and R. Q. Snurr (2016). RASPA: molecular simulation software for adsorption and diffusion in flexible nanoporous materials. *Mol. Sim.* **42**, 81–101.
- Dufumier, H. and L. Rivera (1997). On the resolution of the isotropic component in moment tensor inversion. *Geophys. J. Int.* **131**, 595–606.
- Dumbser, M., M. Käser, and J. de la Puente (2007). Arbitrary high order finite volume schemes for seismic wave propagation on

- unstructured meshes in 2D and 3D. *Geophys. J. Int.* **171**, 665–694.
- Dumbser, M., M. Käser, and E. Toro (2007). An arbitrary high-order discontinuous Galerkin method for elastic waves on unstructured meshes, Part V: Local time stepping and  $p$ -adaptivity. *Geophys. J. Int.* **171**, 695–717.
- Dupond, T. (1973). A  $l^2$  estimate of Galerkin methods for second order hyperbolic equations. *SIMA J. Num. Anal.* **10**, 880–891.
- Duputel, Z., V. Ferrazzini, F. Brenguier, N. Shapiro, M. Campillo, and A. Nercessian (2009). Real time monitoring of relative velocity changes using ambient seismic noise at the Piton de la Fournaise volcano (La Reunion) from January 2006 to June 2007. *J. Volc. Geoth. Res.* **184**, 164–173.
- Durand, S., J.-P. Montagner, P. Roux, F. Brenguier, R. M. Nadeau, and Y. Ricard (2011). Passive monitoring of anisotropy change associated with the Parkfield 2004 earthquake. *Geophys. Res. Lett.* **38**, doi:10.1029/2011GL047875.
- Durek, J. J. and G. Ekström (1996). A radial model of anelasticity consistent with long-period surface wave attenuation. *Bull. Seis. Soc. Am.* **86**, 144–158.
- Duvall, T. L., A. C. Birch, and L. Gizon (2006). Direct measurement of travel-time kernels for helioseismology. *Astrophys. J.* **646**, 553–559.
- Dworetzky, M. M. (1983). A period-finding method for sparse randomly spaced observations or “how long is a piece of string?”. *Month. Not. R. Astr. Soc.* **203**, 917–924.
- Dziewoński, A. (1995). Global seismic tomography of the mantle. *Rev. Geophys.* **33**, 419–423. Supplement.
- Dziewoński, A. M. and D. L. Anderson (1981). Preliminary reference Earth model. *Phys. Earth Planet. Inter.* **25**, 297–356.
- Dziewoński, A. M., T.-A. Chou, and J. H. Woodhouse (1981). Determination of earthquake source parameters from waveform data for studies of global and regional seismicity. *J. Geophys. Res.* **10**, 2825–2852.
- Dziewoński, A. M. and F. Gilbert (1974). Temporal variation of the seismic moment tensor and the evidence for precursive compression for two deep earthquakes. *Nature* **247**, 185–188.
- Dziewoński, A. M., B. H. Hager, and R. J. O’Connell (1977). Large-scale heterogeneities in the lower mantle. *J. Geophys. Res.* **82**, 239–255.
- Dziewoński, A. M., A. L. Hales, and E. R. Lapwood (1975). Parametrically simple Earth models consistent with geophysical data. *Phys. Earth Planet. Int.* **10**, 12–48.
- Dziewoński, A. M. and J. H. Woodhouse (1981). An experiment in systematic study of global seismicity: centroid-moment tensor solutions for 201 moderate and large earthquakes of 1981. *J. Geophys. Res.* **88**, 3247–3271.
- Edmonds, A. R. (1960). *Angular Momentum and Quantum Mechanics*. Princeton University Press, NJ.
- Egeran, N. and E. Lahn (1944). Note sur la carte sismique de la Turquie au 1:2.400.000. *Maden Tekt. Arama Enst. Mecmuasi* **2/32**, 279–289.
- Ekström, G. and A. M. Dziewoński (1998). The unique anisotropy of the Pacific upper mantle. *Nature* **394**, 168–172.
- Ekström, G., M. Nettles, and A. M. Dziewoński (2012). The global CMT project 2004–2010: centroid moment tensors for 13,017 earthquakes. *Phys. Earth Planet. Inter.* **200–201**, 1–9.
- El Moudnib, L., A. Villaseñor, M. Harnafi, J. Gallart, A. Pazos, I. Serrano, D. C. nd J. A. Pulgar, P. Ibarra, M. M. Himmi, and M. Chourak (2015). Crustal structure of the Betic–Rif system, western Mediterranean, from local earthquake tomography. *Tectonophysics* **643**, 94–105.
- Elhatisari, S., D. Lee, G. Rupak, E. Epelbaum, H. Krebs, T. A. Lahde, T. Luu, and U.-G. M. ner (2015). Ab initio alpha-alpha scattering. *Nature* **258**, 111–113.
- Emmerich, H. and M. Korn (1987). Incorporation of attenuation into time-domain computations of seismic wave fields. *Geophysics* **52**, 1252–1264.
- Endrun, B., T. Meier, . Lebedev, M. Bonhoff, G. Stavrakakis, and H.-P. Harjes (2008). S velocity structure and radial anisotropy in the Aegean region from surface wave dispersion. *Geophys. J. Int.* **74**, 593–16.
- Engquist, B. and O. Runborg (2002). Wavelet-based numerical homogenisation with applications. In T. J. Barth, T. Chan, and R. Haimes (Eds.), *Lecture Notes Comp. Sci. Eng. - Multiscale and Multiresolution Methods*, pp. 97–148. Berlin, Heidelberg: Springer.
- Engquist, B. and L. Ying (2011a). Sweeping preconditioner for the Helmholtz equation: Hierarchical matrix representation. *Comm. Pure Appl. Math.* **64**, 697–735.
- Engquist, B. and L. Ying (2011b). Sweeping preconditioner for the Helmholtz equation: Moving perfectly matched layers. *Multiscale Mod. Sim.* **9**, 686–710.
- Epanomeritakis, I., V. Akcelik, O. Ghattas, and J. Bielak (2008). A newton-cg method for large-scale three-dimensional elastic full waveform seismic inversion. *Inverse Problems* **24**, doi:10.1088/0266–5611/24/3/034015.
- Ermert, L., K. Sager, M. Afanasiev, C. Boehm, and A. Fichtner (2017). Ambient seismic source inversion in a heterogeneous Earth: Theory and application to the Earth’s hum. *J. Geophys. Res.* **122**, 9184–9207.
- Ermert, L., A. Villaseñor, and A. Fichtner (2016). Cross-correlation imaging of ambient noise sources. *Geophys. J. Int.* **204**, 347–364.
- Ernst, J. R., A. G. Green, H. Maurer, and K. Holliger (2007). Application of a new 2D time-domain full-waveform inversion scheme to crosshole radar data. *Geophysics* **72**, J53–J64.
- Ewing, W. M., W. S. Jardetzky, and F. Press (1957). *Elastic waves in layered media*. McGraw-Hill, New York, Toronto, London.
- Faccenna, C., T. W. Becker, S. Lallemand, Y. Lagabrielle, F. Funiciello, and C. Piromallo (2010). Subduction-triggered magmatic pulses: A new class of plumes? *Earth Planet. Sci. Lett.* **299**, 54–68.
- Faccioli, E., F. Maggio, R. Paolucci, and A. Quarteroni (1997). 2D and 3D elastic wave propagation by a pseudospectral domain decomposition method. *J. Seismology* **1**, 237–251.
- Faccioli, E., F. Maggio, A. Quarteroni, and A. Tagliani (1996). Spectral-domain decomposition methods for the solution of acoustic and elastic wave equations. *Geophysics* **61:4**, 1160–1174.
- Fang, B. T. (1990). Simple solutions for hyperbolic and related position fixes. *IEEE Trans. Aerosp. Electr. Sys.* **26**, 748–753.
- Fang, Y., M. Cheney, and S. Roecker (2010). Imaging from sparse measurements. *Geophys. J. Int.* **180**, 1289–1302.

- Farnetani, C. G. (1997). Excess temperature of mantle plumes: The role of chemical stratification across D". *Geophys. Res. Lett.* **24**, 1583–1586.
- Farnetani, C. G. and M. A. Richards (1995). Thermal entrainment and melting in mantle plumes. *Earth Planet. Sci. Lett.* **136**, 251–267.
- Farra, V., E. Stutzmann, L. Gualtieri, and F. Arduin (2016). Ray-theoretical modeling of secondary microseism p waves. *Geophys. J. Int.* **206**, 1730–1739.
- Ferreira, A. M. G. and H. Igel (2009). Rotational motions of seismic surface waves in a laterally heterogeneous Earth. *Bull. Seis. Soc. Am.* **99**, 1429–1436.
- Ferreira, A. M. G., J. H. Woodhouse, K. Visser, and J. Trampert (2010). On the robustness of global radially anisotropic surface wave tomography. *J. Geophys. Res.* **115**, doi:10.29/2009JB006716.
- Fichtner, A. (2010). *Full Seismic Waveform Modelling and Inversion*. Springer, Heidelberg.
- Fichtner, A. (2014). Source and processing effects on noise correlations. *Geophys. J. Int.* **197**, 1527–1531.
- Fichtner, A. (2015). Source-structure trade-offs in ambient noise correlations. *Geophys. J. Int.* **202**, 678–694.
- Fichtner, A. (2021). *Lecture Notes on Inverse Theory*. doi:10.33774/coe-2021-qqq2j; Cambridge Open Engage.
- Fichtner, A., D. Bowden, and L. Ermert (2020). Optimal processing for seismic noise correlations. *Geophys. J. Int.* **223**, 1548–1564.
- Fichtner, A., H.-P. Bunge, and H. Igel (2006a). The adjoint method in seismology - I. Theory. *Phys. Earth Planet. Inter.* **157**, 86–104.
- Fichtner, A., H.-P. Bunge, and H. Igel (2006b). The adjoint method in seismology - II. Applications: traveltimes and sensitivity functionals. *Phys. Earth Planet. Inter.* **157**, 105–123.
- Fichtner, A., M. De Wit, and M. van Bergen (2010). Subduction of continental lithosphere in the Banda Sea region: Combining evidence from full waveform tomography and isotope ratios. *Earth Planet. Sci. Lett.* **297**, 405–412.
- Fichtner, A., P. Edme, P. Paitz, N. Lindner, M. Hohl, P. Hugenin, B. Sovilla, P. Roig-Lafon, E. Surinach, and F. Walter (2021). Observing avalanche dynamics with distributed acoustic sensing. *EGU General Assembly 2021*, doi.org:10.5194/egusphere-egu21-16562.
- Fichtner, A., L. Ermert, and A. Gokhberg (2017). Seismic noise correlation on heterogeneous supercomputers. *Seis. Res. Lett.* **88**, 1141–1145.
- Fichtner, A., S. Fishwick, K. Yoshizawa, and B. L. N. Kennett (2012). Optimal spherical spline filters for the analysis and comparison of regional-scale tomographic models. *Phys. Earth Planet. Int.* **190-191**, 44–50.
- Fichtner, A. and S. M. Hanasoge (2017). Discrete wave equation upscaling. *Geophys. J. Int.* **209**, 353–357.
- Fichtner, A. and H. Igel (2008). Efficient numerical surface wave propagation through the optimization of discrete crustal models - a technique based on non-linear dispersion curve matching (DCM). *Geophys. J. Int.* **173**, 519–533.
- Fichtner, A. and H. Igel (2009). Sensitivity densities for rotational ground motion measurements. *Bull. Seis. Soc. Am.* **99**, 1302–1314.
- Fichtner, A., B. L. N. Kennett, H. Igel, and H.-P. Bunge (2008). Theoretical background for continental- and global-scale full-waveform inversion in the time-frequency domain. *Geophys. J. Int.* **175**, 665–685.
- Fichtner, A., B. L. N. Kennett, H. Igel, and H.-P. Bunge (2009a). Full seismic waveform tomography for upper-mantle structure in the Australasian region using adjoint methods. *Geophys. J. Int.* **179**, 1703–1725.
- Fichtner, A., B. L. N. Kennett, H. Igel, and H.-P. Bunge (2009b). Spectral-element simulation and inversion of seismic waves in a spherical section of the Earth. *J. Num. An. Ind. Appl. Math.* **4**, 11–22.
- Fichtner, A., B. L. N. Kennett, H. Igel, and H.-P. Bunge (2010). Full waveform tomography for radially anisotropic structure: New insight into present and past states of the Australasian upper mantle. *Earth Planet. Sci. Lett.* **290**, 270–280.
- Fichtner, A., B. L. N. Kennett, and J. Trampert (2013). Separating intrinsic and apparent anisotropy. *Phys. Earth Planet. Int.* **219**, 11–20.
- Fichtner, A., E. Saygin, T. Taymaz, P. Cupillard, Y. Capdeville, and J. Trampert (2013). The deep structure of the North Anatolian Fault Zone. *Earth Planet. Sci. Lett.* **373**, 109–117.
- Fichtner, A. and S. Simute (2018). Hamiltonian Monte Carlo inversion of seismic sources in complex media. *J. Geophys. Res.* **123**, doi:10.1002/2017JB015249.
- Fichtner, A., L. Stehly, L. Ermert, and C. Boehm (2017). Generalised interferometry - I. Theory for inter-station correlations. *Geophys. J. Int.* **208**, 603–638.
- Fichtner, A. and H. Tkalčić (2010). Insights into the kinematics of a volcanic caldera drop: Probabilistic finite-source inversion of the 1996 Bardarbunga, Iceland, earthquake. *Earth Planet. Sci. Lett.* **297**, 607–615.
- Fichtner, A. and J. Trampert (2011a). Hessian kernels of seismic data functionals based upon adjoint techniques. *Geophys. J. Int.* **185**, 775–798.
- Fichtner, A. and J. Trampert (2011b). Resolution analysis in full waveform inversion. *Geophys. J. Int.* **187**, 1604–1624.
- Fichtner, A., J. Trampert, P. Cupillard, E. Saygin, T. Taymaz, Y. Capdeville, and A. Villasenor (2013). Multi-scale full waveform inversion. *Geophys. J. Int.* **194**, 534–556.
- Fichtner, A. and V. Tsai (2019). Theoretical foundations of noise interferometry. In N. Nakata, L. Gualtieri, and A. Fichtner (Eds.), *Seismic Ambient Noise*, pp. 109–143. Cambridge University Press, Cambridge, U.K.
- Fichtner, A. and M. van Driel (2014). Models and Fréchet kernels for frequency-(in)dependent Q. *Geophys. J. Int.* **198**, 1878–1889.
- Fichtner, A., D. van Herwaarden, M. Afanasiev, S. Simute, L. Krischer, Y. Cubuk-Sabuncu, T. Taymaz, L. Colli, E. Saygin, A. Villasenor, J. Trampert, P. Cupillard, H.-P. Bunge, and H. Igel (2018). The Collaborative Seismic Earth Model: Generation I. *Geophys. Res. Lett.* **45**, 4007–4016.
- Fichtner, A. and T. van Leeuwen (2015). Resolution analysis by random probing. *J. Geophys. Res.* **120**, doi:10.1002/2015JB012106.
- Fichtner, A. and A. Villaseñor (2015). Crust and upper mantle of the western Mediterranean - Constraints from full-waveform inversion. *Earth Planet. Sci. Lett.* **428**, 52–62.
- Fichtner, A. and A. Zunino (2019). Hamiltonian nullspace shuttles. *Geophys. Res. Lett.* **46**, doi:10.1029/2018GL080931.
- Fichtner, A., A. Zunino, and L. Gebraad (2018). A Tutorial Introduction to the Hamiltonian Monte Carlo Solution

- of Weakly Nonlinear Inverse Problems. *EarthArXiv*, doi:10.31223/osf.io/3k9vu.
- Fichtner, A., A. Zunino, and L. Gebraad (2019). Hamiltonian Monte Carlo solution of tomographic inverse problems. *Geophys. J. Int.* **216**, doi:10.1093/gji/ggy496.
- Fichtner, A., A. Zunino, L. Gebraad, and C. Boehm (2021). Autotuning Hamiltonian Monte Carlo for efficient generalised nullspace exploration. *Geophys. J. Int.* **227**, 941–968.
- Finlayson, B. (1972). *The Method of Weighted residuals and variational principles*. New-York: Academic Press.
- Fish, J., W. Chen, and G. Nagai (2002). Non-local dispersive model for wave propagation in heterogeneous media: one-dimensional case. *Int. J. Num. Meth. Eng.* **54**, 331–346.
- Fishwick, S., M. Heintz, B. L. N. Kennett, A. M. Reading, and K. Yoshizawa (2008). Steps in lithospheric thickness within eastern Australia, evidence from surface wave tomography. *Tectonics* **27**, doi:10.1029/2007TC002116.
- Fishwick, S., B. L. N. Kennett, and A. M. Reading (2005). Contrasts in lithospheric structure within the Australian Craton. *Earth Planet. Sci. Lett.* **231**, 163–176.
- Flanagan, M. P. and D. A. Wiens (1998). Attenuation of broadband P and S waves in Tonga. *Pure. Appl. Geophys.* **153**, 345–375.
- Fletcher, R. (1970). A new approach to variable metric algorithms. *Comp. J.* **13**, 317–322.
- Fletcher, R., X. Du, and P. J. Fowler (2008). A new pseudo-acoustic wave equation for TI media. *SEG Expanded Abstracts* **78**, 2082–2086.
- Fletcher, R. and C. M. Reeves (1964). Function minimization by conjugate gradients. *Comp. J.* **7**, 149–154.
- Fleury, C., R. Snieder, and K. Larner (2010). General representation theorem for perturbed media and application to Green's function retrieval for scattering problems. *Geophys. J. Int.* **183**, 1648–1662.
- Fomel, S. (2002). Application of plane-wave destruction filters. *Geophysics* **67**, 1946–1960.
- Fontaine, F., G. Barruol, B. L. N. Kennett, G. H. R. Bokelmann, and D. Reymond (2009). Upper mantle anisotropy beneath Australia and Tahiti from P polarization: Implications for real-time earthquake location. *J. Geophys. Res.* **114**, doi:10.1029/2008JB005709.
- Forghani, F. and R. Snieder (2010). Underestimation of body waves and feasibility of surface-wave reconstruction by seismic interferometry. *The Leading Edge* **29**, 790–794.
- Fornberg, B. (1988). The pseudospectral method: accurate representation of interfaces in elastic wave calculations. *Geophysics* **53**, 625–637.
- Fornberg, B. (1995). A pseudospectral approach for polar and spherical geometries. *SIAM J. Sci. Comp.* **16**, 1071–1081.
- Foulger, G. R. (2007). The plate model for the genesis of melting anomalies. *Geol. Soc. Am. Special Paper* **430**, 1–28.
- Fox, C. and G. Nicholls (1997). Sampling conductivity images via mcmc. In K. V. Mardia, C. A. Gill, and R. G. Aykroyd (Eds.), *The Art and Science of Bayesian Image Analysis*, pp. 91–100. Leeds University Press, Leeds, U.K.
- Frankel, A. (1989). A review of numerical experiments on seismic wave scattering. *Pure Appl. Geophys.* **4**, 639–685.
- Frankel, A. and R. Clayton (1986). Finite-difference simulations of seismic scattering: implications for the propagation of of short period seismic waves in the crust and models of crustal heterogeneity. *J. Geophys. Res.* **91**, 6465–6489.
- French, S. W., V. Lekic, and B. A. Romanowicz (2013). Waveform tomography reveals channeled flow at the base of the oceanic lithosphere. *Science* **342**, 227–230.
- French, S. W. and B. A. Romanowicz (2014). Whole-mantle radially anisotropic shear velocity structure from spectral-element waveform tomography. *Geophys. J. Int.* **199**, 1303–1327.
- Fretwell, P. and Pritchard, H. D. and Vaughan, D. G. and Bamber, J. L. and Barrand, N. E. and Bell, R. and Bianchi, C. and Bingham, R. G. and Blankenship, D. D. and Casassa, G. and Catania, G. and Callens, D. and Conway, H. and Cook, A. J. and Corr, H. F. J. and Damaske, D. and Damm, V. and Ferraccioli, F. and Forsberg, R. and Fujita, S. and Gim, Y. and Gogineni, P. and Griggs, J. A. and Hindmarsh, R. C. A. and Holmlund, P. and Holt, J. W. and Jacobel, R. W. and Jenkins, A. and Jokat, W. and Jordan, T. and King, E. C. and Kohler, J. and Krabill, W. and Riger-Kusk, M. and Langley, K. A. and Leitchenkov, G. and Leuschen, C. and Luyendyk, B. P. and Matsuoka, K. and Mouginot, J. and Nitsche, F. O. and Nogi, Y. and Nost, O. A. and Popov, S. V. and Rignot, E. and Rippin, D. M. and Rivera, A. and Roberts, J. and Ross, N. and Siegert, M. J. and Smith, A. M. and Steinhage, D. and Studinger, M. and Sun, B. and Tinto, B. K. and Welch, B. C. and Wilson, D. and Young, D. A. and Xiangbin, C. and Zirizzotti, A. (2013). Bedmap2: improved ice bed, surface and thickness datasets for antarctica. *The Cryosphere* **7**(1), 375–393.
- Friederich, W. (1999). Propagation of seismic shear and surface waves in a laterally heterogeneous mantle by multiple forward scattering. *Geophys. J. Int.* **136**, 180–204.
- Friederich, W. (2003). The S-velocity structure of the East Asian mantle from inversion of shear and surface waveforms. *Geophys. J. Int.* **153**, 88–102.
- Friederich, W. and J. Dalkolmo (1995). Complete synthetic seismograms for a spherically symmetric Earth by a numerical computation of the Green's function in the frequency domain. *Geophys. J. Int.* **122**, 537–550.
- Friederich, W., E. Wielandt, and S. Stange (1993). Multiple forward scattering of surface waves: comparison with an exact solution and Born single-scattering methods. *Geophys. J. Int.* **112**, 264–275.
- Frieze, A., R. Kannan, and S. Vempala (2004). Fast Monte Carlo algorithms for finding low-rank approximations. *J. Assoc. Comput. Mach.* **51**, 1025–1041.
- Froment, B., M. Campillo, P. Roux, P. Gouédard, A. Verdel, and R. L. Weaver (2010). Estimation of the effect of nonisotropically distributed energy on the apparent arrival time in correlations. *Geophysics* **75**, SA85–SA93.
- Fu, T., L. Luo, and Z. Zhang (2016). Quasi-Newton Hamiltonian Monte Carlo. In *Proc. 32nd Conf. Uncert. Art. Int.*, pp. 212–221. AUA Press, Arlington, U.S.
- Fuchs, K. (1977). Seismic anisotropy of the subcrustal lithosphere as evidence for dynamical processes in the upper mantle. *Geophys. J. R. astr. Soc.* **49**, 167–179.
- Fuchs, K. and G. Müller (1971). Computation of synthetic seismograms with the reflectivity method and comparison with observations. *Geophys. J. R. Astron. Soc.* **23**, 417–433.

- Fukuyama, E., M. Ishida, D. Dreger, and H. Kawai (1998). Automated seismic moment tensor determination by using on-line broadband seismic waveforms. *J. Seismol. Soc. Jpn.* **51**, 149–156. in Japanese with English abstract.
- Furumura, M., B. Kennett, and T. Furumura (1999). Seismic wavefield calculation for laterally heterogeneous Earth models – II. The influence of upper mantle heterogeneity. *Geophys. J. Int.* **139**, 623–644.
- Furumura, T., B. Kennett, and M. Furumura (1998). Seismic wavefield calculation for laterally heterogeneous whole earth models using the pseudospectral method. *Geophys. J. Int.* **135**, 845–860.
- Furumura, T., B. Kennett, and H. Takenaka (1998). Parallel 3-D pseudospectral simulation of seismic wave propagation. *Geophysics* **63**, 279–288.
- Furumura, T. and B. L. N. Kennett (2005). Subduction zone guided waves and the heterogeneity structure of the subducted plate – intensity anomalies in northern Japan. *J. Geophys. Res.* **110**, doi:10.129/2004JB003486.
- Furumura, T. and H. Takenaka (1996). 2.5-D modeling of elastic waves using the pseudospectral method. *Geophys. J. Int.* **124**, 820–832.
- Gaite, B., A. Villaseñor, A. Iglesias, M. Herraiz, and I. Jiménez-Munt (2015). A 3-D shear velocity model of the southern North American and Caribbean plates from ambient noise and earthquake tomography. *Solid Earth*. **6**, 271–284.
- Gal, M. and A. M. Reading (2019). Beamforming and polarisation analysis. In N. Nakata, L. Gualtieri, and A. Fichtner (Eds.), *Seismic Ambient Noise*, pp. 32–73. Cambridge University Press, Cambridge, U.K.
- Gallagher, K., M. S. Sambridge, and G. G. Drijkoningen (1991). Genetic algorithms: an evolution of Monte Carlo methods for strongly non-linear geophysical optimization problems. *Geophys. Res. Lett.* **18**, 2177–2180.
- Gallovic, F., W. Imperatori, and P. M. Mai (2015). Effects of three-dimensional crustal structure and smoothing constraint on earthquake slip inversions: Case study of the Mw6.3 2009 L'Aquila earthquake. *J. Geophys. Res.* **120**, 428–449.
- Gao, F. C., A. R. Levander, R. G. Pratt, C. A. Zelt, and G. L. Fradelizio (2006). Waveform tomography at a groundwater contamination site. *Geophysics* **71**, H1–H11.
- García, R. and A. Souriau (2000). Amplitude of the core-mantle boundary topography estimated by stochastic analysis of core phases. *PEPI* **117**, 345–359.
- Gardner, G. H. F., L. W. Gardner, and A. R. Gregory (1974). Formation velocity and density—the diagnostic basics for stratigraphic traps. *Geophysics* **39**, 770–780.
- Garnero, E. (2000). Lower mantle heterogeneity. *Ann. Rev. Earth Planetary Sci.* **28**, 509–37.
- Garnero, E. and D. Helmberger (1995a). A very slow basal layer underlying large-scale low-velocity anomalies in the lower mantle beneath the Pacific: evidence for core phases. *Phys. Earth. Planet. Int.* **91**, 161–176.
- Garnero, E. and D. V. Helmberger (1995b). A very slow basal layer underlying large-scale low-velocity anomalies in the lower mantle beneath the Pacific. *J. Geophys. Res.* **98**, 8225–8241.
- Garnero, E. and D. V. Helmberger (1996). Seismic detection of a thin laterally varying boundary layer at the base of the mantle beneath the central-pacific. *Geophys. Res. Lett.* **23**, 977–980.
- Garnero, E. and D. V. Helmberger (1998). Further structural constraints and uncertainties of a thin laterally varying ultralow-velocity layer at the base of the mantle. *J. Geophys. Res.* **103**, 12,495–12,509.
- Garnero, E. and T. Lay (1997). Lateral variations in the lowermost mantle shear wave anisotropy beneath north Pacific and Alaska. *J. Geophys. Res.* **102**, 8121–8135.
- Garnero, E. and J. E. Vidale (1999). ScP: a probe of ultralow velocity zones at the base of the mantle. *Geophys. Res. Lett.* **26**, 377–380.
- Gauss, C. F. (1809). *Theoria motus corporum coelestium in sectionibus conicis solem ambientium*. Frid. Perthes et I. H. Besser.
- Gauthier, O., J. Virieux, and A. Tarantola (1986). Two-dimensional nonlinear inversion of seismic waveforms: numerical results. *Geophysics* **51**, 1387–1403.
- Gazdag, J. (1981). Modeling of the acoustic wave propagation with transform methods. *Geophysics* **46**, 854–859.
- Gebraad, L., C. Boehm, and A. Fichtner (2020). Bayesian elastic full-waveform inversion using Hamiltonian Monte Carlo. *J. Geophys. Res.* **125**.
- Gee, L. S. and T. H. Jordan (1992). Generalized seismological data functionals. *Geophys. J. Int.* **111**, 363–390.
- Geller, R., R. M. Moak, and A. L. Fetter (1985). Normal modes solutions for absorbing boundary conditions. *Geophys. Res. Lett.* **12**, 145–148.
- Geller, R. and T. Ohminato (1994). Computation of synthetic seismograms and their partial derivatives for heterogeneous media with arbitrary natural boundary conditions using the Direct Solution Method. *Geophys. J. Int.* **116**, 421–446.
- Geller, R. and S. Stein (1978). Normal modes of laterally heterogeneous body: a one-dimensional example. *Bull. Seismol. Soc. Am.* **68**, 103–116.
- Geller, R. and N. Takeuchi (1995a). A new method for computing highly accurate DSM synthetic seismograms. *Geophys. J. Int.* **123**, 449–470.
- Geller, R. and N. Takeuchi (1995b). A new method for computing highly accurate DSM synthetic seismograms. *Geophys. J. Int.* **123**, 449–470.
- Gelman, A., J. B. Carlin, H. S. Stern, D. B. Dunson, A. Vehtari, and D. B. Rubin (2013). *Bayesian Data Analysis* (3 ed.). CRC Press, Boca Raton, FL.
- Gelman, A. and D. B. Rubin (1992). Inference from iterative simulation using multiple sequences. *Stat. Sci.* **7**, 457–511.
- Geweke, J. (1992). Evaluating the accuracy of sampling-based approaches to the calculation of posterior moments. *Bayesian Stat.* **4**, 169–193.
- Geweke, J. and T. Tanizaki (1999). On Markov-chain Monte Carlo methods for nonlinear and non-Gaussian state-space models. *Comm. Stat. Sim. Comp.* **28**, 867–894.
- Geyer, C. J. (1992). Practical Markov chain Monte Carlo. *Stat. Sci.* **7**, 473–483.
- Geyer, C. J. (2011). Introduction to Markov chain Monte Carlo. In *Handbook of Markov chain Monte Carlo*, pp. Chapter 1.
- Geyer, C. J. and E. A. Thompson (1995). Annealing Markov Chain Monte Carlo with applications to ancestral inference. *J. Am. Stat. Assoc.* **90**, 909–920.
- Giardini, D., X.-D. Li, and J. H. Woodhouse (1987). Three-dimensional structure of the Earth from splitting in free-oscillation spectra. *Nature* **325**, 405–411.

- Gilbert, F. (1971). Excitation of normal modes of the earth by earthquake sources. *Geophys. J. R. Astron. Soc.* **22**, 223–226.
- Gilbert, F. (1973). Derivation of source parameters from low-frequency spectra. *Phil. Trans. R. Soc. London, A* **274**, 369–371.
- Gilbert, F. (1980). Introduction to low-frequency seismology. In *Physics of the Earth Interiors*, Int. School of Physics, “Enrico Fermi”, Amsterdam, pp. 127–151. North-Holland.
- Gilbert, F. and A. Dziewoński (1975). An application of normal mode theory to the retrieval of structural parameters and source mechanisms for seismic spectra. *Philos. Trans. R. Soc. London* **278**, 187–269. Ser. A.
- Gilliland, R. (1981). Solutions of the shallow water equations on the sphere. *J. Comp. Physics* **43**, 79–94.
- Gimbert, F. and V. C. Tsai (2016). Predicting short-period wind-wave generated seismic noise in coastal regions. *Earth Planet. Sci. Lett.* **426**, 280–292.
- Girolami, M. and B. Calderhead (2011). Riemann manifold Langevin and Hamiltonian Monte Carlo methods. *J. Royal Stat. Soc.: Series B* **73**, 123–214.
- Givoli, D. and J. Keller (1989). Exact non-reflecting boundary conditions. *J. Comp. Phys.* **82**, 172–192.
- Givoli, D. and J. Keller (1990). Non-reflecting boundary conditions for elastic waves. *Wave Motion* **12**, 261–279.
- Gizon, L. and A. C. Birch (2002). Time-distance helioseismology: the forward problem for random distributed sources. *Astrophys. J.* **571**, 966–986.
- Glatzmaier, G. A. and P. H. Roberts (1995). A three-dimensional self-consistent computer simulation of a geomagnetic field reversal. *Nature* **377**, 203–209.
- Global Volcanism Program (2012). Grimsvotn (373010). In *Volcanoes of the World*, v. 4.10.5 (27 Jan 2022), ed. E Venzke, pp. doi:10.5479/si.GVP.VOTW4–2013. Smithsonian Institution.
- Global Volcanism Program (2021). Report on grimsvotn (iceland). In *Weekly Volcanic Activity Report, 1 December-7 December 2021*, ed. S. K. Sennert. Smithsonian Institution and US Geological Survey.
- Godin, O. A. (2009). Emergence of deterministic Green’s functions from noise generated by finite random sources. *Phys. Rev. E* **80**, 066605.
- Goetze, C. (1971). High temperature rheology of Westerly granite. *J. Geophys. Res.* **76**, 1223–1230.
- Goetze, C. and W. F. Brace (1972). Laboratory observations of high-temperature rheology of rocks. *Tectonophysics*. **13**, 583–600.
- Gokhberg, A. and A. Fichtner (2016). Full-waveform inversion on heterogeneous HPC systems. *Comp. Geosci.* **89**, 260–268.
- Goldfarb, D. (1970). A Family of Variable Metric Updates Derived by Variational Means. *Math. Comp.* **24**, 23–26.
- Gorbatov, A. and B. L. N. Kennett (2003). Joint bulk-sound and shear tomography for Western Pacific subduction zones. *Earth Planet. Sci. Lett.* **210**, 527–543.
- Gram, J. P. (1883). Ueber die Entwicklung reeller Functionen in Reihen mittelst der Methode der kleinsten Quadrate. *Journal für die reine und angewandte Mathematik* **94**, 6–73.
- Grand, S., R. VanDerHilst, and S. Widiyantoro (1997). Global seismic tomography: A snapshot of convection in the earth. *Geol. Soc. Am. Today* **7**, No.4, 1–7.
- Grant, F. (1973). Magnetic susceptibility mapping: the first year’s experience. In *43rd Annual International meeting*. Society of Exploration Geophysicists.
- Graves, R. W. (1996). Simulating seismic wave propagation in 3D elastic media using staggered finite differences. *Bull. Seis. Soc. Am.* **86**, 1091–1106.
- Graves, R. W., T. H. Jordan, S. Callaghan, E. Deelman, E. Field, G. Juve, C. Kesselman, P. Maechling, G. Mehta, K. Milner, D. Okaya, P. Small, and K. Vahi (2010). CyberShake: A physics-based seismic hazard model for Southern California. *Pure Appl. Geophys.* **168**, 367–381.
- Graves, R. W. and D. J. Wald (2001). Resolution analysis of finite fault source inversion using one- and three-dimensional Green’s functions - 1: Strong motions. *J. Geophys. Res.* **106**, 8745–8766.
- Green, P. J. (1995). Reversible jump Markov Chain Monte Carlo computation and Bayesian model determination. *Biometrika* **82**, 711–732.
- Green, P. J. and D. I. Hastie (2009). Reversible jump MCMC.
- Griewank, A. and A. Walther (2000). An implementation of checkpointing for the reverse or adjoint mode of computational differentiation. *Trans. Math. Software* **26**, 19–45.
- Griffiths, R. W. and I. H. Campell (1990). Stirring and structure in mantle starting plumes. *Earth Planet. Sci. Lett.* **99**, 66–78.
- Groos, J. C., S. Bussat, and J. R. R. Ritter (2012). Performance of different processing schemes in seismic noise cross-correlations. *Geophys. J. Int.* **188**, 498–512.
- Grote, M. J. and J. Keller (1995). On Nonreflecting Boundary Conditions. *J. Comput. Phys.* **122**, 231–243.
- Gu, Y. J., A. M. Dziewonski, and G. Ekström (2001). Preferential detection of the Lehmann discontinuity beneath continents. *Geophys. Res. Lett.* **28**, 4655–4658.
- Gualtieri, L., E. Stutzmann, Y. Capdeville, F. Arduin, A. M. M. Schimmel, and A. Morelli (2013). Modeling secondary microseismic noise by normal mode summation. *Geophys. J. Int.* **193**, 1732–1745.
- Gualtieri, L., E. Stutzmann, C. Juretzek, C. Hadziioannou, and F. Arduin (2019). Global-scale analysis and modeling of primary microseisms. *Geophys. J. Int.* **218**, 560–572.
- Guasch, L., O. Calderón Agudo, P. Nachev, and M. Warner (2020). Full-waveform inversion imaging of the human brain. *NPJ Digital Medicine* **28**, doi:10.1038/s41746–020–0240–8.
- Gudmundsson, M. T., F. Sigmundsson, and H. Björnsson (1997). Ice-volcano interaction of the 1996 Gjalp subglacial eruption, Vatnajökull, Iceland. *Nature* **389**, 954–957.
- Gueguen, Y., M. Darot, P. Mazot, and J. Woïrgard (1989).  $Q^{-1}$  of forsterite single crystals. *Phys. Earth Planet. Int.* **55**, 254–258.
- Guillot, L., Y. Capdeville, and J. J. Marigo (2010). 2-D non periodic homogenization for the SH wave equation. *Geophys. J. Int.* **182**, 1438–1454.
- Gull, S. F. (1988). Bayesian inductive inference and maximum entropy. In *Maximum-entropy and Bayesian methods in science and engineering*, pp. 53–74.
- Gung, Y. C., M. Panning, and B. Romanowicz (2003). Global anisotropy and the thickness of continents. *Geophys. J. Int.* **422**, 707–711.

- Gung, Y. C. and B. Romanowicz (2004). Q tomography of the upper mantle using three component long period waveforms. *Geophys. J. Int.* **157**, 813–830.
- Gutmann, M. U. and A. Hyvärinen (2012). Noise-contrastive estimation of unnormalized statistical models with applications to natural image statistics. *J. Mach. Learning. Res.* **13**, 307–361.
- Haberland, C. and A. Rietbrock (2001). Attenuation tomography in the western central Andes: A detailed insight into the structure of a magmatic arc. *J. Geophys. Res.* **106**, 11151–11167.
- Hadziioannou, C., P. Gaebler, J. Wassermann, and H. Igel (2012). Examining ambient noise using co-located measurements of rotational and translational motion. *J. Seis.* **16**, 787–796.
- Halko, N., P. G. Martinsson, and J. A. Tropp (2011). Finding structure with randomness: Probabilistic algorithms for constructing approximate matrix decompositions. *SIAM Review* **53**, 217–288.
- Hall, R. (2002). Cenozoic geological and plate tectonic evolution of SE Asia and the SW Pacific: computer-based reconstructions, model and animations. *J. Asian Earth Sci.* **20**, 353–431.
- Halliday, D. and A. Curtis (2008). Seismic interferometry, surface waves and source distribution. *Geophys. J. Int.* **175**, 1067–1087.
- Halliday, D. and A. Curtis (2009). Seismic interferometry of scattered surface waves in attenuative media. *Geophys. J. Int.* **178**, 419–446.
- Hammond, W. C. and E. D. Humphreys (2000). Upper mantle seismic wave velocity: Effects of realistic partial melt geometries. **105:B5**, 10975–10986.
- Hanasoge, S. M. (2013a). Measurements and kernels for source-structure inversions in noise tomography. *Geophys. J. Int.* **192**, 971–985.
- Hanasoge, S. M. (2013b). The influence of noise sources on cross-correlation amplitudes. *Geophys. J. Int.* **192**, 295–309.
- Hanasoge, S. M. (2016). Spatio-spectral concentration of convolutions. *J. Comp. Phys.* **313**, 674–686.
- Hanasoge, S. M., A. Birch, L. Gizon, and J. Tromp (2011). The adjoint method applied to time-distance helioseismology. *Astrophys. J.* **738**, doi:10.1088/0004-637X/738/1/100.
- Hanasoge, S. M. and M. Branicki (2013). Interpreting cross-correlations of one-bit filtered noise. *Geophys. J. Int.* **195**, 1811–1830.
- Haned, A., E. Stutzmann, M. Schimmel, S. Kiselev, A. Davaille, and A. Yelles-Chaouche (2016). Global tomography using seismic hum. *Geophys. J. Int.* **204**, 1222–1236.
- Hanson, K. M. and G. S. Cunningham (1998). Posterior sampling with improved efficiency. *Proc. SPIE Medical Imaging* **3338**, 371–382.
- Hapla, V., M. van Driel, M. Afanasiev, C. Boehm, and L. Krischer (2018). Extreme scale seismic wave propagation simulations for Mars. In *PASC Conference 2018*.
- Hara, T., S. Tsuboi, and R. Geller (1993). Inversion for laterally heterogeneous upper mantle S-wave velocity structure using iterative waveform inversion. *Geophys. J. Int.* **115**, 667–698.
- Harmon, N., C. Rychert, and P. Gerstoft (2010). Distribution of noise sources for seismic interferometry. *Geophys. J. Int.* **183**, 1470–1484.
- Hart, S. R., E. H. Hauri, L. A. Oschmann, and J. A. Whitehead (1992). Mantle plumes and entrainment: isotopic evidence. *Science* **256**, 517–520.
- Hartog, A. (2017). *An introduction to distributed optical fibre sensors*. CRC Press, Boca Raton.
- Hasselmann, K. (1963). A statistical analysis of the generation of microseisms. *Rev. Geophys.* **1**(2), 177–210.
- Hastings, W. K. (1970). Monte Carlo sampling methods using Markov Chains and their applications. *Biometrika* **57**, 97–109.
- Hayes, G. (2011). Rapid source characterization of the 03-11-2011 Mw 9.0 off the Pacific coast of Tohoku earthquake. *Earth planet. Space* **63**, 529–534.
- Haykin, S. (2009). *Neural networks and learning machines*. Prentice Hall.
- Hedjazian, N., Y. Capdeville, and T. Bodin (2020). Multiscale seismic imaging with inverse homogenization. *Geophys. J. Int.*, under review.
- Hedlin, M. A. H., P. M. Shearer, and P. S. Earle (1997). Seismic evidence for small-scale heterogeneity throughout the Earth's mantle. *Nature* **387**(6629), 145–150.
- Heikes, R. and D. Randall (1995a). Numerical integration of the shallow-water equations on a twisted icosahedral grid. Part I: Basic design and results of tests. *Mon. Wea. Rev.* **123**(123), 1862–1880.
- Heikes, R. and D. Randall (1995b). Numerical integration of the shallow-water equations on a twisted icosahedral grid. Part II: A detailed description of the grid and an analysis of numerical accuracy. *Mon. Wea. Rev.* **123**(123), 1881–1887.
- Hejrani, B., H. Tkalcic, and A. Fichtner (2017). Centroid moment tensor catalogue using a 3D continental scale Earth model: application to earthquakes in Papua New Guinea and the Solomon Islands. *J. Geophys. Res.* **122**, 5517–5543.
- Helmberger, D. V. (1983). Theory and application of synthetic seismograms. In H. Kanamori (Ed.), *Earthquakes: Observation, Theory and Interpretation*, pp. 173–222. Soc. Italianadi Fisica, Bologna, Italy.
- Henstock, T. J., A. Levander, and J. A. Hole (1997). Deformation in the lower crust of the San Andreas Fault system in northern California. *Science* **278**, 650–653.
- Hernlund, J., P. Tackley, and D. Stevenson (2008). Buoyant melting instabilities beneath extending lithosphere: 1. Numerical models. *J. Geophys. Res.* **113**, doi:10.1029/2006JB004862.
- Hess, H. H. (1964). Seismic anisotropy of the uppermost mantle under oceans. *Nature* **203**, 629–631.
- Hestenes, M. R. and E. L. Stiefel (1952). Methods of conjugate gradients for solving linear systems. *J. Res. Natl. Bur. Stand.* **49**, 409–436.
- Hill, D. (2015). Distributed Acoustic Sensing (DAS): Theory and applications. *Frontiers in Optics* **2015**, doi:10.1364/FIO.2015.FTh4E.1.
- Hillers, G., M. Campillo, Y.-Y. Lin, K.-F. Ma, and R. Roux (2012). Anatomy of the high-frequency ambient seismic wave field at the TCDP borehole. *J. Geophys. Res.* **117**, doi:10.1029/2011JB008999.
- Hillers, G., S. Husen, A. Obermann, T. Planes, E. Larose, and M. Campillo (2015). Noise-based monitoring and imaging of aseismic transient deformation induced by the 2006 Basel reservoir stimulation. *Geophysics* **80**, KS51–KS68.
- Himmelblau, D. M. (1972). *Applied nonlinear programming*. McGraw Hill.

- Hingee, M., H. Tkalčić, A. Fichtner, and M. Sambridge (2011). Seismic moment tensor inversion using a 3-D structural model: applications for the Australian region. *Geophys. J. Int.* **184**, 949–964.
- Hoeffding, W. (1963). Probability inequalities for sums of bounded random variables. *J. Am. Stat. Ass.* **58**, 13–30.
- Hoffmann, M. D. and A. Gelman (2014). The No-U-Turn sampler. *J. Mach. Learn. Res.* **15**, 1593–1623.
- Hofmann, A. W. (1997). Mantle geochemistry: the message from oceanic volcanism. *Nature* **385**, 219–229.
- Honkela, A., J. Peltonen, H. Topa, I. Charapitsa, F. Matarese, K. Grote, H. G. Stunnenberg, G. Reid, N. D. Lawrence, and M. Rattray (2015). Genome-wide modeling of transcription kinetics reveals patterns of RNA production delays. *Proc. Nat. Acad. Sci.* **112**, 13115–13120.
- Hornmann, J. C. (2016). Field trial of seismic recording using distributed acoustic sensing with broadside sensitive fibre-optic cables. *Geophys. Prosp.* **65**, doi:10.1111/1365-2478.12358.
- Hounsfield, G. N. (1973). Computerized transverse axial scanning (tomography): Part i. description of system. *British J. Radiology* **46**, 1016–1022.
- Hsieh, M., L. Zhao, and K. Ma (2014). Efficient waveform inversion for average earthquake rupture in three-dimensional structures. *Geophysical Journal International* **198**, 1279–1292.
- Hu, J., G. T. Schuster, and P. A. Valasek (2001). Poststack migration deconvolution. *Geophys. J. Int.* **66**, 939–952.
- Huang, H.-H., F.-C. Lin, V. C. Tsai, and K. D. Koper (2016). High-resolution probing of inner core structure with seismic interferometry. *Geophys. Res. Lett.*, in press.
- Huang, J. and D. Zhao (2006). High-resolution mantle tomography of China and surrounding regions. *J. Geophys. Res.* **111**, doi:10.1029/2005JB004066.
- Huang, W.-J. and K. M. Johnson (2012). Strain accumulation across strike-slip faults: Investigation of the influence of laterally varying lithospheric properties. *J. Geophys. Res.* **117**, doi:10.1029/2012JB009424.
- Hudson, J. A., R. G. Pearce, and R. M. Rogers (1989). Source type plot for inversion of the moment tensor. *J. Geophys. Res.* **94**, 765–774.
- Hughes, T. and J. Marsden (1978). Classical elastodynamics as a linear symmetric hyperbolic system. *J. Elasticity* **8**, 97–110.
- Hung, S.-H., F. Dahlen, and G. Nolet (2001). Wavefront healing: a banana-doughnut perspective. *Geophys. J. Int.* **146**, 289–312.
- Hutchinson, M. F. (1990). A stochastic estimator of the trace of the influence matrix for Laplacian smoothing splines. *Comm. Stat. Sim.* **19**, 433–450.
- Iacono, M. I., E. Neufeld, E. Akinagabe, K. Bower, J. Wolf, O. Vogiatzis, D. Sharma, B. Lloyd, B. J. Wilm, M. Wyss, K. P. Pruessmann, A. Jakab, N. Makris, E. D. Cohen, N. Kuster, W. Kainz, and L. M. Angelone (2015). A multimodal imaging-based detailed anatomical model of the human head and neck. *PLOS ONE* **10**, e0124126.
- Igel, H. (1999). Modeling wave propagation in 3-D spherical sections by the Chebyshev spectral method. *Geophys. J. Int.* **136**, 559–567.
- Igel, H. (2016). *Computational seismology: A practical introduction*. Oxford University Press.
- Igel, H., H. Djikpesse, and A. Tarantola (1996). Waveform inversion of marine reflection seismograms for P impedance and Poisson's ratio. *Geophys. J. Int.* **124**, 363–371.
- Igel, H. and O. Gudmundsson (1997). Frequency-dependent effects on travel times and waveforms of long-period S and SS waves. *Phys. Earth. Planet. Int.* **104**, 229–246.
- Igel, H., P. Mora, and B. Rioulet (1995). Anisotropic wave propagation through FD grids. *Geophysics* **60**, 1203–1216.
- Igel, H., U. Schreiber, A. Flaws, B. Schuberth, A. Velikosevtsev, and A. Cochard (2005). Rotational motions induced by the M8.1 Tokachi-oki earthquake, September 25, 2003. *Geophys. Res. Lett.* **32**, doi:10.1029/2004GL022336.
- Igel, H., N. Takeuchi, R. Geller, C. Megnin, H. P. Bunge, E. Clévéde, J. Dalkomo, and B. Romanowicz (2000). The COSY Project: verification of global seismic modeling algorithms. *Phys. Earth Planet. Inter.* **119**, 3–23.
- Igel, H. and M. Weber (1996). P-SV wave propagation in the Earth's mantle using finite-differences: application to heterogeneous lowermost mantle structure. *Geophys. Res. Lett.* **23**, 731–734.
- Igel, J., L. Ermert, and A. Fichtner (2021). Rapid finite-frequency microseismic noise source inversion at regional to global scales. *Geophys. J. Int.* **227**, 169–183.
- Ihlenburg, F. (1998). *Finite Element Analysis of Acoustic Scattering*. Applied Mathematical Sciences 132, Springer.
- Ingber, L. (1989). Very fast simulated reannealing. *Math. Comp. Modeling* **12**, 967–993.
- Ingle, J. C. (1992). Subsidence of the Japan Sea: Stratigraphic evidence from ODP sites and onshore sections. *Proc. Ocean Drill. Program Sci. Results* **127/128**, 1197–1218.
- Inoue, H., Y. Fukao, K. Tanabe, and Y. Ogata (1990). Whole mantle P-wave travel time tomography. *Phys. Earth. Planet. Int.* **59**, 294–328.
- Ishii, M. and J. Tromp (1999). Normal-mode and free-air gravity constraints on lateral variations in velocity and density of Earth's mantle. *Science* **285**, 1231–1236.
- Ishii, M. and J. Tromp (2001). Even-degree lateral variations in the Earth's mantle constrained by free oscillations and the free-air gravity anomaly. *Geophys. J. Int.* **145**, 77–96.
- Ishii, M. and J. Tromp (2004). Constraining large-scale mantle heterogeneity using mantle and inner-core sensitive normal modes. *Phys. Earth Planet. Inter.* **146**, 113–124.
- Ismail-Zadeh, A., S. Honda, and I. Tsepelev (2013). Linking mantle upwelling with the lithosphere descent and the Japan Sea evolution: a hypothesis. *Scientific Reports* **3**, doi:10.1038/srep01137.
- Isserlis, L. (1918). On a formula for the product-moment coefficient of any order of a normal frequency distribution in any number of variables. *Biometrika* **12**, 134–139.
- Itoh, Y. (1988). Differential rotation of the eastern part of southwest Japan inferred from paleomagnetism of Cretaceous and Neogene rocks. *J. Geophys. Res.* **93**:B4, 3401–3411.
- ITU (2022). ITU Recommendations. <https://www.itu.int/en/ITU-T/publications/Pages/recs.aspx>.
- Iyer, H. M. and K. Hirahara (1993). *Seismic tomography, Theory and Practice*. Chapman & Hall.
- Izzatullah, M., T. van Leeuwen, and D. Peter (2021). Bayesian seismic inversion: Fast sampling Langevin dynamics Markov chain Monte Carlo. *Geophys. J. Int.*, under review.

- Jackson, D. D. (1976). Most squares inversion. *J. Geophys. Res.* **81**, 1027–1030.
- Jackson, I. (2000). Laboratory measurements of seismic wave dispersion and attenuation: Recent progress. In S.-I. Karato, A. M. Forte, R. C. Liebermann, G. Masters, and L. Stixrude (Eds.), *Earth's Deep Interior*, pp. 265–289. American Geophysical Union, Washington D. C.
- Jackson, I. (2007). Physical origins of anelasticity and attenuation in rock. In G. Schubert (Ed.), *Treatise on Geophysics*, pp. 493–525. Elsevier.
- Jackson, I., J. D. Fitz Gerald, U. H. Faul, and B. H. Tan (2002). Grain-size-sensitive seismic wave attenuation in polycrystalline olivine. *J. Geophys. Res.* **107**, doi:10.1029/2001JB001225.
- Jahnke, G., M. S. Thorne, A. Cochard, and H. Igel (2008). Global SH-wave propagation using a parallel axisymmetric spherical finite-difference scheme: application to whole-mantle scattering. *Geophys. J. Int.* **173**, 815–826.
- Jakob-Chien, R. and B. Alpert (1997). A fast spherical filter with uniform resolution. *J. Comp. Phys.* **136**, 580–584.
- Jaynes, E. T. (2003). *Probability Theory - The Logic of Science*. Cambridge University Press, Cambridge, UK.
- Jeffreys, H. (1939). *Theory of Probability*. Oxford University Press, Oxford, UK.
- Jeffreys, H. and K. E. Bullen (1940). *Seismological Tables*. British Association for the Advancement of Science, London.
- Jeong, W., H.-Y. Lee, and D.-J. Min (2012). Full-waveform inversion strategy for density in the frequency domain. *Geophys. J. Int.* **188**, 1221–1242.
- Jih, R., K. McLaughlin, and Z. Der (1988). Free-boundary conditions for arbitrary polygonal topography in a two-dimensional explicit elastic finite-difference scheme. *Geophysics* **53**, 1045–1055.
- Jolivet, L., K. Tamaki, and M. Fournier (1994). Japan Sea, opening history and mechanism: A synthesis. *J. Geophys. Res.* **99**, No. **B11**, 22237–22259.
- Jordan, T. (1978a). A procedure for estimating lateral variations from low-frequency eigenspectra data. *Geophys. J. R. Astr. Soc.* **52**, 441–445.
- Jordan, T. H. (1975). The continental tectosphere. *Rev. Geophys.* **13**, 1–12.
- Jordan, T. H. (1978b). Composition and development of the continental tectosphere. *Nature* **274**, 544–548.
- Jordan, T. H. (2015). An effective medium theory for three-dimensional elastic heterogeneities. *Geophys. J. Int.* **203**, 1343–1354.
- Jost, M. L. and R. B. Herrmann (1989). A student's guide to and review of moment tensors. *Seis. Res. Lett.* **60**, 37–57.
- Kaneshima, S. and G. Helffrich (2009). Lower mantle scattering profiles and fabric below Pacific subduction zones. *Earth Planet. Sci. Lett* **282**, 234–239.
- Kang, I. and G. McMechan (1990). Two-dimensional elastic pseudospectral modeling of wide-aperture seismic array data with application to the Wichita Uplift-Andarko Basin region of southwestern Oklahoma. *Bull. Seism. Soc. Am.* **80**, 1677–1695.
- Kang, T.-S. and C.-E. Baag (2004). Finite-difference seismic simulation combining discontinuous grids with locally variable timesteps. *Bull. Seism. Soc. Am.* **94**, 207–219.
- Karabulut, H., S. Ozalaybey, T. Taymaz, M. Aktar, O. Selvi, and A. Kocaoglu (2003). A tomographic image of the shallow crustal structure in the Eastern Marmara. *Geophys. Res. Lett.* **30**, doi:10.1029/2003GL018074.
- Karaoğlu, H. and B. Romanowicz (2018a). Global seismic attenuation imaging using full-waveform inversion: a comparative assessment of different choices of misfit functionals. *Geophys. J. Int.* **212**, 807–826.
- Karaoğlu, H. and B. Romanowicz (2018b). Inferring global upper-mantle shear attenuation structure by waveform tomography using the spectral element method. *Geophys. J. Int.* **213**, 1536–1558.
- Karason, H. and R. D. van der Hilst (2000). Constraints on mantle convection from seismic tomography. *The history and dynamics of global plate motions*, 277–288.
- Karato, S.-I. (1995). Effects of water on seismic wave velocities in the upper mantle. *Proc. Japan Acad.* **71**, 61–66.
- Karato, S.-I. (2008). *Deformation of Earth Materials*. Cambridge University Press.
- Karato, S.-I. (2014). Does partial melting explain geophysical anomalies? *Phys. Earth Planet. Inter.* **228**, 300–306.
- Karato, S.-I., T. Ologboji, and J. Park (2015). Mechanisms and geologic significance of the mid-lithosphere discontinuity in the continents. *Nature Geoscience* **8**, 509–514.
- Karato, S.-I. and H. A. Spetzler (1990). Defect microdynamics in minerals and solid state mechanisms of seismic wave attenuation and velocity dispersion in the mantle. *Rev. Geophys.* **28**, 399–421.
- Käufel, P., A. Fichtner, and H. Igel (2013). Probabilistic full waveform inversion based on tectonic regionalisation - Development and application to the Australian upper mantle. *Geophys. J. Int.* **193**, 437–451.
- Käufel, P., A. Valentine, R. de Wit, and J. Trampert (2015). Robust and fast probabilistic source parameter estimation from near-field displacement waveforms using pattern recognition. *Bull. Seis. Soc. Am.* **105**, 2299–2312.
- Kawai, K. and R. J. Geller (2010). Waveform inversion for localised seismic structure and an application to D'' structure beneath the Pacific. *J. Geophys. Res.* **115**, doi:10.1029/2009JB006503.
- Kawakatsu, H., S. Kaneshima, H. Matsubayashi, T. Ohminato, Y. Sudo, T. Tsutsui, K. Uehira, H. Yamasato, H. Ito, and D. Legrand (2000). Aso94: Aso seismic observation with broadband instruments. *Journal of Volcanology and Geothermal Research* **101**(1-2), 129–154.
- Kawakatsu, H., P. Kumar, Y. Takei, M. Shinohara, T. Kanazawa, E. Araki, and K. Suyehiro (2009). Seismic evidence for sharp lithosphere-asthenosphere boundaries of oceanic plates. *Science* **324**, 499–502.
- Kawamoto, T. (2006). Hydrous phases and water transport in the subducting slab. *Rev. Mineral. Geochem.* **62**, 273–289.
- Keilis-Borok, V. J. and T. B. Yanovskaya (1967). Inverse problems of seismology (structural review). *Geophys. J. Roy. Astr. Soc.* **13**, 223–234.
- Kelly, K., R. Ward, S. Treitel, and R. Alford (1976). Synthetic seismograms: a finite difference approach. *Geophysics* **41**, 2–27.
- Kendall, J. and P. Silver (1996). Constraints from seismic anisotropy on the nature of the lowermost mantle. *Nature* **381**, 409–412.

- Kendall, J. and P. Silver (1998). Investigating the cause of D'' anisotropy. In M. G. et al. (Ed.), *The Core-Mantle boundary region*, Volume 28 of *Geodyn. Ser.*, pp. 21–36. Washington D.C.: AGU.
- Kennett, B. (1985). On regional S. *Bull. Seism. Soc. Am.* **75**, 1077–1086.
- Kennett, B. and J. Bowman (1990). The velocity structure and heterogeneity of the upper mantle. *Phys. Earth. Planet. Int.* **59**, 134–144.
- Kennett, B. and G. Nolet (1978). Resolution analysis for discrete systems. *Geophys. J. R. astr. Soc.* **53**, 413–425.
- Kennett, B., S. Widiyantoro, and R. van der Hilst (1998). Joint seismic tomography for bulk-sound and shear wave speed in the Earth's mantle. *J. Geophys. Res.* **103**, 12469–12493.
- Kennett, B. L. N. (1978). Some aspects of nonlinear inversion. *Geophys. J. Int.* **55**, 373–391.
- Kennett, B. L. N. (1997). Observational and theoretical constraints on crustal and upper mantle. *Phys. Earth. Planet. Int.* **47**, 319–332.
- Kennett, B. L. N. (1998). On the density distribution within the Earth. *Geophys. J. Int.* **132**, 374–382.
- Kennett, B. L. N. (2001). *The seismic wavefield I. - Introduction and theoretical development*. Cambridge University Press.
- Kennett, B. L. N. (2020). Radial Earth models revisited. *Geophys. J. Int.* **222**, 2189–2204.
- Kennett, B. L. N. and A. Abdullah (2011). Seismic wave attenuation beneath the Australasian region. *Austr. J. Earth Sci.* **58**, 285–295.
- Kennett, B. L. N. and H.-P. Bunge (2008). *Geophysical Continua*. Cambridge University Press.
- Kennett, B. L. N. and E. R. Engdahl (1991). Traveltimes for Global Earthquake Location and Phase Identification. *Geophys. J. Int.* **105**, 429–465.
- Kennett, B. L. N., E. R. Engdahl, and R. Buland (1995). Constraints on seismic velocities in the Earth from traveltimes. *Geophys. J. Int.* **122**, 108–124.
- Kennett, B. L. N. and A. Fichtner (2012). A unified concept for the comparison of seismograms using transfer functions. *Geophys. J. Int.* **191**, 1403–1416.
- Kennett, B. L. N., A. Fichtner, S. Fishwick, and K. Yoshizawa (2013). Australian Seismological Reference Model (AuSREM): mantle component. *Geophys. J. Int.* **192**, 871–887.
- Kennett, B. L. N. and T. Furumura (2008). Stochastic waveguide in the lithosphere: Indonesian subduction zone to Australian craton. *Geophys. J. Int.* **172**, 363–382.
- Kennett, B. L. N. and M. S. Sambridge (1998). Inversion for multiple parameter classes. *Geophys. J. Int.* **135**, 304–306.
- Kennett, B. L. N., M. S. Sambridge, and P. R. Williamson (1988). Subspace methods for large inverse problems with multiple parameter classes. *Geophys. J. Int.* **94**, 237–247.
- Kennett, B. L. N. and P. R. Williamson (1987). Subspace methods for large-scale nonlinear inversion. in: *Mathematical Geophysics*, eds. N. J. Vlaar, G. Nolet, M. J. R. Wortel, S. A. P. L. Cloetingh; D. Reidel Publishing Company, 139–154.
- Keogh, E. and A. Mueen (2011). *Encyclopedia of machine learning*. Springer.
- Keskin, M. (2003). Magma generation by slab steepening and breakoff beneath a subduction accretion complex: An alternative model for collision-related volcanism in Eastern Anatolia, Turkey. *Geophys. Res. Lett.* **30**, doi:10.1029/2003GL018019.
- Kessler, D. and D. Kosloff (1990). Acoustic wave propagation in 2-D cylindrical coordinates. *Geophys. J. Int.* **103**, 577–587.
- Khan, A., A. Zunino, and F. Deschamps (2013). Upper mantle compositional variations and discontinuity topography imaged beneath Australia from Bayesian inversion of surface-wave phase velocities and thermochemical modeling. *J. Geophys. Res.* **118**, doi:10.1002/jgrb.50304.
- Kikuchi, M. and H. Kanamori (1991). Inversion of complex body waves - III. *Bull. Seis. Soc. Am.* **81**, 2335–2350.
- Kim, H.-J., S.-J. Han, G. H. Lee, and S. Huh (1998). Seismic study of the Ulleung Basin crust and its implications for the opening of the East Sea (Japan Sea). *Mar. Geophys. Res.* **20**, 219–237.
- Kim, K. H., T. Tanaka, K. Nagao, and S. K. Jang (1999). Nd and Sr isotopes and K-Ar ages of the Ulreungdo alkali volcanic rocks in the East Sea, South Korea. *Geochem. J.* **33**, 317–341.
- Kim, Y.-G., S.-M. Lee, and O. Matsubayashi (2010). New heat flow measurements in the Ulleung Basin, East Sea (Sea of Japan): relationship to local BSR depth, and implications for regional heat flow distribution. *Geo-Mar. Lett.* **30**, 595–603.
- Kimman, W. and J. Trampert (2010). Approximations in seismic interferometry and their effects on surface waves. *Geophys. J. Int.* **182**, 461–476.
- King, G. C. P., A. Hubert-Ferrari, S. S. N. and B. Meyer, R. Armijo, and D. Bowman (2001). Coulomb interactions and the 17 August 1999 Izmit, Turkey, earthquake. *Compt. Rend. Acad. Sci., Ser. A* **333**, 557–569.
- Kirby, J. F. and C. J. Swain (2006). Mapping the mechanical anisotropy of the lithosphere using a 2D wavelet coherence, and its Application to Australia. *Phys. Earth Planet. Sci. Lett.* **158**, 122–138.
- Kirkpatrick, S., C. D. Gelatt, and M. P. Vecchi (1983). Optimization by Simulated Annealing. *Science* **220**, 671–680.
- Kissling, E. (1988). Geotomography with local earthquake data. *Rev. Geophys.* **26**, 659–698.
- Kiwiel, K. C. (2001). Convergence and efficiency of subgradient methods for quasiconvex minimization. *Math. Prog.* **90**, 1–25.
- Klaasen, S., P. Paitz, N. Lindner, J. Dettmer, and A. Fichtner (2021). Distributed Acoustic Sensing in volcano-glacial environments — Mount Meager, British Columbia. *J. Geophys. Res.* **159**, doi:10.1029/2021JB022358.
- Klaasen, S., S. Thrastarson, A. Fichtner, Y. Cubuk-Sabuncu, and K. Jonsdottir (2022). Sensing Iceland's most active volcano with a "buried hair". *EOS* **103**, doi:10.1029/2022EO220007.
- Klimeš, L. (2002). Correlation functions of random media. *Pure appl. Geophys.* **159**, 1811–1831.
- Knopoff, L. and M. J. Randall (1970). The compensated linear-vector dipole: A possible mechanism for deep earthquakes. *J. Geophys. Res.* **54**, 4957–4963.
- Kobayashi, K., S. Kasuga, and K. Okino (1995). Shikoku Basin and Its Margins. In B. Taylor (Ed.), *Backarc Basins*, pp. 381–405. Springer US.
- Koelmeijer, P., A. Deuss, and J. Ritsema (2017). Density structure of earth's lowermost mantle from Stoneley mode splitting observations. *Nature Communications*, doi:10.1038/ncomms15241.

- Koelemeijer, P., J. Ritsema, A. Deuss, and H.-J. van Heijst (2015). Sp12rts: a degree-12 model of shear- and compressional-wave velocity for earth's mantle. *Geophys. J. Int.*, 1024–1039.
- Köhn, D., A. Kurzmann, A. Przybrowska, D. de Nil, and T. Bohlen (2010). 2D elastic full waveform tomography of synthetic marine reflection seismic data. *DGG Mitteilungen* **1**/2010, 23–27.
- Kohnen, H. (1974). The temperature dependence of seismic waves in ice. *J. Glaciology*, 144–147.
- Kolmogorov, A. N. (1941). Stationary sequences in Hilbert space (in Russian). *Bull. Moscow. Univ.* **2**, 1–40.
- Kolmogorov, A. N. (1950). *Foundations of the theory of probability*. Chelsea Pub. Co., New York.
- Komatitsch, D. (1997). *Méthodes spectrales et éléments spectraux pour l'équation de l'élastodynamique 2D et 3D en milieu hétérogène*. Thèse de doctorat de l'Université Paris 7.
- Komatitsch, D. (2011). Fluid-solid coupling on a cluster of GPU graphics cards for seismic wave propagation. *C. R. Mécanique* **339**, 125–135.
- Komatitsch, D., C. Barnes, and J. Tromp (2000a). Simulation of anisotropic wave propagation based upon a spectral element method. *Geophysics*. in press.
- Komatitsch, D., C. Barnes, and J. Tromp (2000b). Wave propagation near a fluid-solid interface: a spectral element approach. *Geophysics*. in press.
- Komatitsch, D., G. Erlebacher, D. Göldeke, and D. Michea (2010). High-order finite-element seismic wave propagation modeling with MPI on a large GPU cluster. *J. Comp. Phys.* **229**, 7692–7714.
- Komatitsch, D. and J. Tromp (1999a). Introduction to the spectral element method for three-dimensional seismic wave propagation. *Geophys. J. Int.* **139**, 806–822.
- Komatitsch, D. and J. Tromp (1999b). Introduction to the spectral element method for three-dimensional seismic wave propagation. *Geophys. J. Int.* **139**, 806–822.
- Komatitsch, D. and J. Tromp (2002a). Spectral-element simulations of global seismic wave propagation, part I: validation. *Geophys. J. Int.* **149**, 390–412.
- Komatitsch, D. and J. Tromp (2002b). Spectral-element simulations of global seismic wave propagation, part II: 3-D models, oceans, rotation, and gravity. *Geophys. J. Int.* **150**, 303–318.
- Komatitsch, D., J. Vilotte, R. Vai, J. Castillo-Covarrubias, and F. Sánchez-Sesma (1999). The spectral element method for elastic wave equations – application to 2-D and 3-D seismic problems. *Int. J. Num. Meth. Engng.* **45**, 1139–1164.
- Komatitsch, D. and J. P. Vilotte (1998). The spectral element method: an effective tool to simulate the seismic response of 2D and 3D geological structures. *Bull. Seism. Soc. Am.* **88**, 368–392.
- Kong, A. (1992). A note on importance sampling using standardized weights. *Technical Report, University of Chicago* **348**.
- Konishi, K., K. Kawai, R. J. Geller, and N. Fuji (2009). Morb in the lowermost mantle beneath the western Pacific: Evidence from waveform inversion. *Earth Planet. Sci. Lett.* **278**, 219–225.
- Korattikara, A., Y. Chen, and M. Welling (2014). Asuterity in MCMC land: Cutting the Metropolis-Hastings budget. *arXiv* **1304.5299**, 1–23.
- Korneev, V. and A. Bakulin (2006). On the fundamentals of the virtual source method. *Geophysics* **71**, A13–A17.
- Kosloff, D., D. Kessler, A. Filho, E. Tessmer, A. Behle, and R. Strahilevitz (1990). Solution of the equations of dynamics elasticity by a Chebyshev spectral method. *Geophysics* **55**, 748–754.
- Kosloff, D. and H. Tal-Ezer (1993). A modified chebyshev pseudospectral method with an  $O(N^{-1})$  time step restriction. *J. Comput. Phys.* **104**, 457–469.
- Kosmas, P. and C. M. Rappaport (2006). FDTD-based time reversal for microwave breast cancer detection - localization in three dimensions. *IEEE Trans. Microw. Theo. Tech.* **54**, 1921–1927.
- Kosloff, D. and E. Bayssal (1982). Forward modeling by Fourier method. *Geophysics* **47**, 1402–1412.
- Kotsi, M., A. Malcolm, and G. Ely (2020). Time-lapse full-waveform inversion using Hamiltonian Monte Carlo: A proof of concept. *SEG Expanded Abstracts*, doi:10.1190/segam2020-3422774.1.
- Kotsi, M., A. E. Malcolm, and G. Ely (2018). 4D full-waveform Metropolis-Hastings inversion using a local acoustic solver. *SEG Expanded Abstracts August 2018*, doi:segam2018-2997858.1.
- Koulakov, I., D. Bindi, S. Parolai, H. Gresser, and C. Milkereit (2010). Distribution of seismic velocities and attenuation in the crust beneath the North Anatolian Fault (Turkey) from local earthquake tomography. *Bull. Seis. Soc. Am.* **100**, 207–224.
- Koulakov, I., E. I. Gordeev, N. L. Dobretsov, V. A. Vernikovskiy, S. Senyukov, A. Jakovlev, and K. Jaxybulatov (2013). Rapid changes in magma storage beneath the Klyuchevskoy group of volcanoes inferred from time-dependent seismic tomography. *J. Volc. Geotherm. Res.* **263**, 75–91.
- Kozlovskaya, E., L. Vecsey, J. Plomerová, and T. Raita (2007). Joint inversion of multiple data types with the use of multiobjective optimization: problem formulation and application to the seismic anisotropy investigations. *Geophys. J. Int.* **171**, 761–779.
- Krass, R. E., B. P. Carlin, A. Gelman, and R. M. Neal (1998). Markov chain Monte Carlo in Practice: A roundtable discussion. *Am. Stat.* **52**, 93–100.
- Krebs, J., J. Anderson, D. Hinkley, R. Neelamani, A. Baumstein, M. D. Lacasse, and S. Lee (2009). Fast full-wavefield seismic inversion using encoded sources. *Geophysics* **74**, WCC177 doi:10.1190/1.3230502.
- Kreemer, C., G. Blewitt, and E. C. Klein (2014). A geodetic plate motion and global strain rate model. *Geochem. Geophys. Geosys.* **15**, 3849–3889.
- Kremers, S., A. Fichtner, G. B. Brietzke, H. Igel, C. Larmat, L. Huang, and M. Käser (2011). Exploring the potential and limitations of the time-reversal imaging of finite seismic sources. *Solid Earth* **2**, 95–105.
- Krischer, L., A. Fichtner, S. Žukauskaitė, and H. Igel (2015). Large-scale seismic inversion framework. *Seis. Res. Lett.* **86**, 1198–1207.
- Krischer, L., H. Igel, and A. Fichtner (2018). Automated large-scale full seismic waveform inversion for North America and the North Atlantic. *J. Geophys. Res.* **123**, doi: 10.1029/2017JB015289.
- Kristek, J., P. Moczo, and R. J. Archuleta (2002). Efficient methods to simulate planar free surface in the 3D 4th-order staggered-grid finite-difference schemes. *Stud. Geophys. Geod.* **46**, 355–381.

- Kristekova, M., J. Kristek, and P. Moczo (2009). Time-frequency misfit and goodness-of-fit criteria for quantitative comparison of time signals. *Geophys. J. Int.* **178**, 813–825.
- Kristekova, M., J. Kristek, P. Moczo, and S. M. Day (2006). Misfit criteria for quantitative comparison of seismograms. *Bull. Seis. Soc. Am.* **96**, 1836–1850.
- Kuang, W. and J. Bloxham (1997). An earthlike numerical dynamo model. *Nature* **389**, 371–374.
- Kullback, S. and A. Leibler (1951). On information and sufficiency. *Ann. Math. Stat.* **22**, 79–86.
- Kumazawa, M. and O. L. Anderson (1969). Elastic Moduli, Pressure Derivates, and Temperature Derivates of Single-Crystal Olivine and Single-Crystal Forstite. *J. Geophys. Res.* **74**, 5961–5972.
- Kuo, B.-Y., W.-C. Chi, C.-R. Lin, E. T.-Y. Chang, J. Collins, and C.-S. Liu (2009). Two-station measurement of Rayleigh-wave phase velocities on the Huatung basin, the westernmost Philippine Sea, with OBS: implications for regional tectonics. *Geophys. J. Int.* **179**, 1859–1869.
- Kuo, C. and B. Romanowicz (2002). On the resolution of density anomalies in the Earth's mantle using spectral fitting of normal mode data. *Geophys. J. Int.* **150**, 162–179.
- Kurrle, D. and R. Widmer-Schnidrig (2006). Spatiotemporal features of the Earth's background oscillations observed in central Europe. *Geophys. Res. Lett.* **33**(24), L24304.
- Lailly, P. (1983). The seismic inverse problem as a sequence of before stack migrations. In J. Bednar, R. Redner, E. Robinson, and A. Weglein (Eds.), *Conference on Inverse Scattering: Theory and Application*. Soc. Industr. appl. Math., Philadelphia, PA.
- Lanczos, C. (1950). An iteration method for the solution of the eigenvalue problem of linear differential and integral operators. *J. Res. Nat. Bur. Standards* **45**, 255–282.
- Landau, L. D. and E. M. Lifshitz (1976). *Course of Theoretical Physics, Volume 1, Mechanics, 3rd edition*. Elsevier Butterworth Heinemann, Amsterdam.
- Lange, M., M. G. Knepley, and G. J. Gorman (2015). Flexible, scalable mesh and data management using petsc dmpex. In *Proceedings of the 3rd International Conference on Exascale Applications and Software*, pp. 71–76. Univ. Edinburgh.
- Langston, C. A. (1979). Structure under Mount Rainier, Washington, inferred from teleseismic body waves. *J. Geophys. Res.* **84**, 4749–4762.
- Larmat, C., J.-P. Montagner, M. Fink, Y. Capdeville, A. Tourin, and E. Clévéde (2006). Time-reversal imaging of seismic sources and application to the great Sumatra earthquake. *Geophys. Res. Lett.* **33**, doi:10.1029/2006GL026336.
- Larose, E., A. Derode, M. Campillo, and M. Fink (2004). Imaging from one-bit correlations of wideband diffuse wave fields. *J. Appl. Phys.* **95**.
- Laske, G. and G. Masters (1996). Constraints on global phase velocity maps from long-period polarization data. *J. Geophys. Res.* **101**, 16059–16075.
- Laske, G. and T. G. Masters (1999). Limits on differential rotation of the inner core from an analysis of the Earth's free oscillations. *Nature* **402**, 66–69.
- Lawrence, J. W. and G. A. Prieto (2011). Attenuation tomography in the western United States from ambient seismic noise. *J. Geophys. Res.* **116**, doi:10.1029/2010JB007836.
- Lay, T. (1995). Seismology of the lower mantle and core-mantle boundary. *Rev. Geophys.*, 325–328. Supplement.
- Lay, T., C. J. Ammon, H. Kanamori, L. Xue, and M. J. Kim (2011). Possible large near-trench slip during the 2011 Mw 9.0 off the Pacific coast of Tohoku earthquake. *Earth planet. Space* **63**, 687–692.
- Lay, T., E. Garnero, C. Young, and J. Gaherty (1997). Scale-lengths of shear velocity heterogeneity at the base of the mantle from S wave differential times. *J. Geophys. Res.* **102**, 9887–9910.
- Lay, T., Q. Williams, and E. Garnero (1998a). The core-mantle boundary layer and the deep Earth dynamics. *Nature* **392**, 461–468.
- Lay, T., Q. Williams, and E. Garnero (1998b). The core-mantle boundary layer and deep Earth dynamics. *Nature* **392**, 461–468.
- Lebedev, S. and R. D. van der Hilst (2008). Global upper-mantle tomography with the automated multimode inversion of surface and S-wave forms. *Geophys. J. Int.* **173**, 505–518.
- Lecocq, T., C. Caudron, and F. Brenguier (2014). MSNoise, a Python Package for Monitoring Seismic Velocity Changes Using Ambient Seismic Noise. *Seismological Research Letters* **85**, 715–726.
- Lee, E. J., P. Chen, and T. H. Jordan (2014). Testing waveform predictions of 3D velocity models against two recent Los Angeles earthquakes. *Seis. Res. Lett.* **85**, 1275–1284.
- Lee, E.-J., P. Chen, T. H. Jordan, P. B. Maechling, M. Denolle, and G. C. Beroza (2014). Full-3D tomography (F3DT) for crustal structure in Southern California based on the scattering-integral (SI) and the adjoint-wavefield (AW) methods. *J. Geophys. Res.* **119**, doi: 10.1002/2014JB011346.
- Lee, G. H., H. J. Kim, M. C. Suh, and J. K. Hong (1999). Crustal structure, volcanism, and opening mode of the Ulleung Basin, East Sea (Sea of Japan). *Tectonophysics* **308**, 503–525.
- Legendre, C. P., T. Meier, S. Lebedev, W. Friederich, and L. Viereck-Götte (2008). A shear-wave velocity model of the European upper mantle from automated inversion of seismic shear and surface waveforms. *Geophys. J. Int.* **173**, 505–518.
- Lei, J. and D. Zhao (2005). P-wave tomography and origin of the Changbai intraplate volcano in Northeast Asia. *Tectonophysics* **397:3-4**, 281–295.
- Leimkuhler, B. and S. Reich (1994). *Simulating Hamiltonian systems*. Cambridge University Press, Cambridge, UK.
- Lekić, V., J. Matas, M. Panning, and B. Romanowicz (2009). Measurement and implications of frequency dependence of attenuation. *Earth Planet. Sci. Lett.* **282**, 285–293.
- Lekić, V., M. Panning, and B. Romanowicz (2010). A simple method for improving crustal corrections in waveform tomography. *Geophys. J. Int.* **182**, 265–278.
- Lekić, V. and B. Romanowicz (2011). Inferring upper-mantle structure by full waveform tomography with the spectral-element method. *Geophys. J. Int.* **185**, 799–831.
- Leng, K., T. Nissen-Meyer, M. van Driel, K. Hosseini, and D. Al-Attar (2019). AxiSEM3D: broad-band seismic wavefields in 3-D global earth models with undulating discontinuities. *Geophys. J. Int.* **217**, 2125–2146.
- Leung, S. and J. Qian (2006). An adjoint state method for three-dimensional transmission traveltime tomography using first-arrivals. *Comm. Math. Sci.* **4**(1), 249–266.

- Levander, A. (1988). Fourth-order finite difference P-SV seismograms. *Geophysics* **53**, 1425–1436.
- Levenberg, K. (1944). A method for the solution of certain nonlinear problems in least-squares. *Q. Appl. Math.* **2**, 164–168.
- Lévéque, J. J., L. Rivera, and G. Wittlinger (1993). On the use of the checkerboard test to assess the resolution of tomographic inversions. *Geophys. J. Int.* **115**, 313–318.
- Levshin, A. and L. Ratnikova (1984). Apparent anisotropy in inhomogeneous media. *Geophys. J. Roy. Astr. Soc.* **76**, 65–69.
- Lewis, M. A., Y. Ben-Zion, and J. J. McGuire (2007). Imaging the deep structure of the San Andreas Fault south of Hollister with joint analysis of fault zone head and direct P arrivals. *Geophys. J. Int.* **169**, 1028–1042.
- Li, C. and R. D. van der Hilst (2010). Structure of the upper mantle and transition zone beneath Southeast Asia from traveltimes tomography. *J. Geophys. Res.* **115**:B7, doi:10.1029/2009JB006882.
- Li, C., R. D. van der Hilst, E. R. Engdahl, and S. Burdick (2008). A new global model for P-wave speed variations in the Earth's mantle. *Geochem. Geophys. Geosys.* **9**, doi:10.1029/2007GC001806.
- Li, M., H. Wang, and G. Tao (2015). Current and future applications of distributed acoustic sensing as a new reservoir geophysics tool. *Open Petr. Eng. J.* **8**, 272–281.
- Li, X. B. and B. Romanowicz (1996). Global mantle shear velocity model developed using nonlinear asymptotic coupling theory. *J. Geophys. Res.* **101**, 11,245–22,271.
- Li, X. D. and B. Romanowicz (1995). Comparison of global waveform inversions with and without considering cross-branch modal coupling. *Geophys. J. Int.* **121**, 695–709.
- Li, X. D. and T. Tanimoto (1993). Waveforms of long-period body waves in slightly aspherical Earth model. *Geophys. J. Int.* **112**, 92–102.
- Li, Y. and D. W. Oldenburg (2000). Joint inversion of surface and three-component borehole magnetic data. *Geophysics* **65**(2), 540–552.
- Lim, C., S. Kim, and C. Lee (2014). Geochemical fingerprint of the primary magma composition in the marine tephra originated from the Baegdusan and Ulleung volcanoes. *J. Asian Earth Sci.* **95**, 266–273.
- Lin, F.-C., D. Li, R. W. Clayton, and D. Hollis (2013). High-resolution 3D shallow crustal structure in Long Beach, California: Application of ambient noise tomography on a dense seismic array. *Geophysics* **78**, Q45–Q56.
- Lin, F.-C., M. P. Moschetti, and M. H. Ritzwoller (2008). Surface wave tomography of the western United States from ambient noise: Rayleigh and Love wave phase velocity maps. *Geophys. J. Int.* **173**, 281–298.
- Lin, F.-C. and B. S. V. C. Tsai (2012). Joint inversion of Rayleigh wave phase velocity and ellipticity using USArray: Constraining velocity and density structure in the upper crust. *Geophys. Res. Lett.* **39**, doi:10.1029/2012GL052196.
- Lin, F.-C., V. C. Tsai, and M. H. Ritzwoller (2012). The local amplification of surface waves: A new observable to constrain elastic velocities, density, and anelastic attenuation. *J. Geophys. Res.* **117**, doi:10.1029/2012JB009208.
- Lin, F.-C., V. C. Tsai, B. Schmandt, Z. Duputel, and Z. Zhan (2013). Extracting seismic core phases with array interferometry. *Geophys. Res. Lett.* **40**, 1049–1053.
- Lindgren, G., H. Rootzen, and M. Sandsten (2013). *Stationary Stochastic Processes for Scientists and Engineers*. CRC Press.
- Lindsey, N. J. and E. Martin (2021). Fiber-optic seismology. *Ann. Rev. Earth Planet. Sci.* **49**, 309–336.
- Lindsey, N. J., E. R. Martin, D. S. Dreger, B. Freifeld, S. Cole, S. R. James, B. L. Biondi, and J. B. Ajo-Franklin (2017). Fiber-optic network observations of earthquake wavefields. *Geophys. Res. Lett.* **44**, 11792–11799.
- Lindsey, N. J., H. Rademacher, and J. B. Ajo-Franklin (2020). On the broadband instrument response of fiber-optic DAS arrays. *J. Geophys. Res.* **125**, doi.org:10.1029/2019JB018145.
- Lions, J.-L. (1968). *Contrôle optimal de systèmes gouvernés par des équations aux dérivées partielles*. Dunod Gauthier-Villars.
- Lipovsky, B. P. (2018). Ice shelf rift propagation and the mechanics of wave-induced fracture. *J. Geophys. Res.* **123**, 4014–4033.
- Lipovsky, B. P. and E. M. Dunham (2015). Vibrational modes of hydraulic fractures: Inference of fracture geometry from resonant frequencies and attenuation. *J. Geophys. Res.* **120**, 1080–1107.
- Liu, D. C. and J. Nocedal (1989). On the limited-memory BFGS method for large-scale optimisation. *Mathematical Programming* **45**, 503–528.
- Liu, H.-P., D. L. Anderson, and H. Kanamori (1976). Velocity dispersion due to anelasticity: implications for seismology and mantle composition. *Geophys. J. Roy. Astr. Soc.* **47**, 41–58.
- Liu, L. and M. Gurnis (2008). Simultaneous inversion of mantle properties and initial conditions using an adjoint of mantle convection. *J. Geophys. Res.* **113**, doi:10.1029/2007JB005594.
- Liu, Q. and Y. Gu (2012). Seismic imaging: from classical to adjoint tomography. *Tectonophysics* **566–567**, 31–66.
- Liu, Q. and D. Peter (2020). Square-root variable metric-based nullspace shuttle: A characterization of the nonuniqueness in elastic full-waveform inversion. *J. Geophys. Res.* **125**, doi:10.1029/2019JB018687.
- Liu, Q., D. Peter, and C. Tape (2019a). Square-root variable metric based elastic full-waveform inversion - Part 1: theory and validation. *Geophys. J. Int.* **218**, doi:10.1093/gji/ggz188.
- Liu, Q., D. Peter, and C. Tape (2019b). Square-root variable metric based elastic full-waveform inversion - Part 2: uncertainty estimation. *Geophys. J. Int.* **218**, doi:10.1093/gji/ggz137.
- Liu, Q., J. Polet, D. Komatitsch, and J. Tromp (2004). Spectral-element moment tensor inversion for earthquakes in Southern California. *Bull. Seis. Soc. Am.* **94**, 1748–1761.
- Liu, Q. and J. Tromp (2006). Finite-frequency kernels based on adjoint methods. *Bull. Seismol. Soc. Am.* **96**, 2383–2397.
- Liu, Q. and J. Tromp (2008). Finite-frequency sensitivity kernels for global seismic wave propagation based upon adjoint methods. *Geophys. J. Int.* **174**, 265–286.
- Liu, X. and Y. Ben-Zion (2013). Estimating correlations of neighbouring frequencies in ambient seismic noise. *Geophys. J. Int.* **206**, 1065–1075.
- Liu, X. and A. Dziewoński (1998a). Global analysis of shear wave velocity anomalies in the lower-most mantle. In M. G. et al. (Ed.), *The Core-Mantle boundary region*, Volume 28 of *Geodyn. Ser.*, pp. 21–36. Washington D.C.: AGU.

- Liu, X. F. and A. M. Dziewoński (1998b). Global analysis of shear wave velocity anomalies in the lowermost mantle. In M. Gurnis, M. E. Wysession, E. Knittle, and B. A. Buffett (Eds.), *Core-Mantle Boundary Region*, Volume 28, pp. 21–36. Geodynamics Series, AGU, Washington, DC.
- Lobkis, O. I. and R. L. Weaver (2001). On the emergence of the Green's function in the correlations of a diffuse field. *J. Acoust. Soc. Am.* **110**, 3011–3017.
- Lognonné, P. (1989). *Modélisation des modes propres de vibration dans une Terre anélastique et hétérogène: théorie et application*. Thèse de doctorat, Université Paris VII.
- Lognonné, P. (1991). Normal modes and seismograms in an anelastic rotating earth. *J. Geophys. Res.* **96**, 20,309–20,319.
- Lognonné, P. and E. Clévéde (1997a). Diffraction of long-period rayleigh waves by a slab: effects of mode coupling. *Geophys. Res. Lett.* **24**, 1035–1038.
- Lognonné, P. and E. Clévéde (1997b). Diffraction of long period rayleigh waves by a slab: effects of mode coupling. *Geophys. Res. Lett.* **24**, 1035–1038.
- Lognonné, P. and E. Clévéde (2000). Normal Modes of the Earth and Planets. In P. Jennings, H. Kanamori, and W. Lee (Eds.), *Handbook of Earthquake and Engineering Seismology*. Paolo Alto, CA: IASPEI. in press.
- Lognonné, P., E. Clévéde, and H. Kanamori (1998). Computation of seismograms and atmospheric oscillations by normal-mode summation for spherical earth model with realistic atmosphere. *Geophys. J. Int.* **135**, 388–406.
- Lognonné, P. and B. Romanowicz (1990). Modelling of coupled normal modes of the Earth: the spectral method. *Geophys. J. Int.* **102**, 365–395.
- Longuet-Higgins, M. S. (1950). A theory of the origin of microseisms. *Philosophical Transactions of the Royal Society of London. Series A, Mathematical and Physical Sciences* **243**(857), 1–35.
- Loper, D. and T. Lay (1995). The core-mantle boundary region. *J. Geophys. Res.* **100**, 6397–6420.
- Love, A. E. H. (1927). *A Treatise on the Theory of Elasticity*. Cambridge University Press, Cambridge, UK.
- Lowrie, W. and A. Fichtner (2020). *Fundamentals of Geophysics*. Cambridge University Press, Cambridge, U.K.
- Lu, D.-Y., H.-Y. Wu, N. S. Yarla, B. Xu, J. Ding, and T.-R. Lu (2018). Haart in hiv/aids treatments: future trends. *Infectious Disorders-Drug Targets (Formerly Current Drug Targets-Infectious Disorders)* **18**(1), 15–22.
- Ludwig, W. J., J. E. Nafe, and C. L. Drake (1970). Seismic refraction. In A. E. Maxwell (Ed.), *The Sea*. Wiley-Interscience, New York.
- Luo, Y. and G. T. Schuster (1991). Wave-equation traveltimes inversion. *Geophysics* **56**, 645–653.
- Luo, Y., Y. Yang, J. Xie, X. Yang, F. Ren, K. Zhao, and H. Xu (2020). Evaluating uncertainties of phase velocity measurements from cross-correlations of ambient seismic noise. *Seis. Res. Lett.* **91**, doi:10.1785/0220190308.
- Lyakhovskiy, V. and Y. Ben-Zion (2009). Evolving geometrical and material properties of fault zones in a damage rheology model. *Geochem. Geophys. Geosys.* **10**, doi:10.1029/2009GC002543.
- Lysmer, J. and L. A. Drake (1972). A finite-element method for seismology. *Methods in Computational Physics* **11**, 181–216.
- Lyu, C., Y. Capdeville, D. Al-Attar, and L. Zhao (2021). Intrinsic non-uniqueness of the acoustic full-waveform inverse problem. *Geophys. J. Int.* **in press**, doi:10.1093/gji/ggab134.
- Ma, Y. and D. Hale (2013). Wave-equation reflection traveltimes inversion with dynamic warping and full-waveform inversion. *Geophysics* **78**(6), R223–R233.
- MacCarthy, J. K., B. Borchers, and R. C. Aster (2011). Efficient stochastic estimation of the model resolution matrix diagonal and generalized cross-validation for large geophysical inverse problems. *J. Geophys. Res.* **116**, doi:10.29/2011JB008234.
- Maceira, M. and C. J. Ammon (2009). Joint inversion of surface wave velocity and gravity observations and its application to central asian basins shear velocity structure. *J. Geophys. Res.* **114**, doi:10.29/2007JB005157.
- MacKay, D. J. C. (2003). *Information theory, inference, and learning algorithms*. Cambridge University Press.
- Mackenzie, P. B. (1989). An improved hybrid Monte Carlo method. *Phys. Lett. B.* **226**, 369–371.
- Madariaga, R. (1972). Spectral splitting of toroidal free oscillations due to lateral heterogeneities of the Earth's structure. *J. Geophys. Res.* **11**, 4421–4431.
- Madariaga, R. (1976). Dynamics of an expanding circular fault. *Bull. Seism. Soc. Am.* **65**, 163–182.
- Maday, Y., C. Mavriplis, and A. T. Patera (1988). Nonconforming mortar element methods: application to spectral discretizations. In T. Chan and R. Glowinski (Eds.), *Second Int. Conference on Domain Decomposition Methods for Partial Differential Equations*. SIAM.
- Maday, Y. and A. Patera (1989a). Spectral element methods for the incompressible Navier-Stokes equations. In A. Noor and J. Oden (Eds.), *State of the Art Survey in Computational Mechanics*, pp. 71–143. New-York: ASME.
- Maday, Y. and A. T. Patera (1989b). Spectral element methods for the incompressible Navier-Stokes equations. In A. K. Noor and J. T. Oden (Eds.), *State of the art survey in computational mechanics*, pp. 71–143. ASME.
- Maday, Y. and A. Quarteroni (1982). Approximation of Burgers equation by pseudospectral methods. *RAIRO Anal. Numer.* **16**, 375–404.
- Maded, R., D. Komatitsch, and J. Diaz (2009). Energy-conserving local time stepping based on high-order finite elements for seismic wave propagation across a fluid-solid interface. *Comp. Mod. Eng. Sci.* **49**, 163–189.
- Maggi, A., C. Tape, M. Chen, D. Chao, and J. Tromp (2009). An automated time-window selection algorithm for seismic tomography. *Geophys. J. Int.* **178**, 257–281.
- Mai, P. M. and K. K. S. Thingbaijam (2014). SRCMOD: An online database of finite-fault rupture models. *Seis. Res. Lett.* **85**, 1348–1357.
- Mainprice, D., A. Tommasi, H. Couvy, P. Cordier, and D. J. Frost (2005). Pressure sensitivity of olivine slip systems and seismic anisotropy in the Earth's upper mantle. *Nature* **433**, 731–733.
- Malcolm, A. E., J. Scales, and B. A. van Tiggelen (2004). Extracting the Green function from diffuse, equipartitioned waves. *Phys. Rev. E* **70**, doi:10.1103/PhysRevE.70.015601.
- Malcolm, A. E. and J. Trampert (2011). Tomographic errors from wave front healing: more than just a fast bias. *Geophys. J. Int.* **185**, 385–402.

- Malinverno, A. (2002). Parsimonious Bayesian Markov chain Monte Carlo inversion in a nonlinear geophysical problem. *Geophys. J. Int.* **151**, 675–688.
- Malinverno, A. (2005). Monte-Carlo Bayesian look-ahead inversion of walkaway vertical seismic profiles. *Geophys. Prosp.* **53**, 689–703.
- Malischewsky, P. (1987). *Surface waves and discontinuities*. Amsterdam ; New York : Elsevier.
- Marelli, S., H. Maurer, and E. Manukyan (2012). Validity of the acoustic approximation in full-waveform seismic crosshole tomography. *Geophysics* **77**, R129–R139.
- Marfurt, K. J. (1984). Accuracy of finite-difference and finite-element modeling of the scalar wave equation. *Geophysics* **49**, 533–549.
- Marinari, E. and G. Parisi (1992). Simulated tempering: a new Monte Carlo scheme. *Europhys. Lett.* **19**, 451–458.
- Marone, F., Y. Gung, and B. Romanowicz (2007). Three-dimensional radial anisotropic structure of the North American upper mantle from inversion of surface waveform data. *Geophys. J. Int.* **171**, 206–222.
- Marone, F. and B. Romanowicz (2007). Non-linear crustal corrections in high resolution waveform seismic tomography. *Geophys. J. Int.* **170**, 460–467.
- Marquardt, D. (1963). An algorithm for least-squares estimation of nonlinear parameters. *SIAM J. Appl. Math.* **11**, 431–441.
- Marquering, H., F. A. Dahlen, and G. Nolet (1999). Three-dimensional sensitivity kernels for finite-frequency traveltimes: the banana-doughnut paradox. *Geophys. J. Int.* **137**, 805–815.
- Marra, G., C. Clivati, R. Lockett, A. Tampellini, J. Kronjäger, L. Wright, A. Mura, F. Levi, S. Robinson, A. Xuereb, B. Baptie, and D. Calónico (2018). Ultrastable laser interferometry for earthquake detection with terrestrial and submarine cables. *Science* **361**, 486–490.
- Martin, E. R., C. M. Castillo, S. Cole, P. S. Sawasdee, S. Yuan, R. Clapp, M. Karrenbach, and B. L. Biondi (2017). Seismic monitoring leveraging existing telecom infrastructure at the SDASA: Active, passive, and ambient-noise analysis. *The Leading Edge* **36**, 1025–1031.
- Martin, J., L. C. Wilcox, C. Burstedde, and O. Ghattas (2012). A stochastic Newton MCMC method for large-scale statistical inverse problems with application to seismic inversion. *SIAM J. Sci. Comp.* **34**, A1460–A1487.
- Martino, L., F. Louzada, and V. Elvira (2016). Alternative effective sample size measures for importance sampling. In *Proceedings of the 2016 IEEE Statistical Signal Processing Workshop*. Institute of Electrical and Electronics Engineers (IEEE), Piscataway, New Jersey, US.
- Marty, P., C. Boehm, and A. Fichtner (2021). Acoustoelastic full-waveform inversion for transcranial ultrasound computed tomography. *Proc. SPIE 11602, Medical Imaging 2021*, doi:10.1117/12.2581029.
- Martyna, G. J. and M. E. Tuckerman (1995). Symplectic reversible integrators: Predictor-corrector methods. *J. Chem. Phys.* **102**, doi:10.1063/1.469006.
- Maruyama, S. and K. Okamoto (2007). Water transportation from the subducting slab into the mantle transition zone. *Gondwana Res.* **11**, 1-2, 148–165.
- Masters, G., S. Johnson, G. Laske, and H. Bolton (1996). A shear velocity model of the mantle. *Phil. Trans. R. Soc. London* **354**, 1385–1411.
- Masters, G., S. Jonhson, G. Laske, and H. Bolton (1996). A shear-velocity model of the mantle. *Philos. Trans. R. Soc. London, Ser. A* **354**, 1385–1411.
- Mateeva, A., J. Lopez, J. Mestayer, P. Wills, B. Cox, D. Kiyashchenko, Z. Yang, W. Berlang, R. Detomo, and S. Grandi (2013). Distributed acoustic sensing for reservoir monitoring with VSP. *The Leading Edge* **October 2013**, 1278–1283.
- Mateeva, A., J. Lopez, H. Potters, J. Mestayer, B. Cox, D. Kiyashchenko, P. Wills, S. Grandi, B. Kuvshinov, W. Berlang, Z. Yang, and R. Detomo (2014). Distributed acoustic sensing for reservoir monitoring with vertical seismic profiling. *Geophys. Prosp.* **62**, 679–692.
- Matsubara, M., K. Obara, and K. Kasahara (2008). Three-dimensional P- and S-wave velocity structures beneath the Japan Islands obtained by high-density seismic stations by seismic tomography. *Tectonophysics* **454**, 86–103.
- Matzel, E., M. Sen, and S. Grand (1996). Evidence for anisotropy in the deep mantle beneath Alaska. *Geophys. Res. Lett.* **23**, 2417–2420.
- Maurer, H., A. Curtis, and D. E. Boerner (2010). Recent advances in optimized geophysical survey design. *Geophysics* **75**, A177–A195.
- Maurer, H., S. Greenhalgh, and S. Latzel (2009). Frequency and spatial sampling strategies for crosshole seismic waveform spectral inversion experiments. *Geophysics* **74**, WCC11–WCC21.
- Maykut, G. and M. G. McPhee (1995). Solar heating of the Arctic mixed layer. *Journal of Geophysical Research: Oceans* **100**(C12), 24691–24703.
- Mayor, M. and D. Queloz (1995). A Jupiter-mass companion to a solar-type star. *Nature* **378**, 355–359.
- McGuire, J. and Y. Ben-Zion (2005). High-resolution imaging of the Bear Valley section of the San Andreas Fault at seismogenic depth with fault-zone head waves and relocated seismicity. *Geophys. J. Int.* **163**, 152–164.
- McNamara, D. E. and R. I. Boaz (2019). Visualization of the seismic ambient noise spectrum. In N. Nakata, L. Gualtieri, and A. Fichtner (Eds.), *Seismic Ambient Noise*, pp. 1–29. Cambridge University Press, Cambridge, U.K.
- Mecozzi, A., M. Cantono, J. C. Castellanos, V. Kamalov, R. Muller, and Z. Zhan (2021). Polarization sensing using submarine optical cables. *Optica* **8**, doi:10.1364/OPTICA.424307.
- Megies, T., M. Beyreuther, R. Barsch, L. Krischer, and J. Wassermann (2011). Obspy - what can it do for data centers and observatories? *Annals Geophys.* **54**, 47–58.
- Mégnin, C. and B. Romanowicz (2000). The 3D shear velocity structure of the mantle from the inversion of body, surface and higher modes wave forms. *Geophys. J. Int.* **143**, 709–728.
- Meier, T., K. Dietrich, B. Stockhert, and H.-P. Harjes (2004). One-dimensional models of shear wave velocity for the eastern Mediterranean obtained from the inversion of Rayleigh wave phase velocities and tectonic implications. *Geophys. J. Int.* **156**, 45–58.

- Meier, U., A. Curtis, and J. Trampert (2007a). Fully nonlinear inversion of fundamental mode surface waves for a global crustal model. *Geophys. Res. Lett.* **34**, doi:10.1029/2007GL030989.
- Meier, U., A. Curtis, and J. Trampert (2007b). Global crustal thickness from neural network inversion of surface wave data. *Geophys. J. Int.* **169**, 706–722.
- Meier, U., N. M. Shapiro, and F. Brenguier (2010). Detecting seasonal variations in seismic velocities within the Los Angeles basin from correlations of ambient seismic noise. *Geophys. J. Int.* **181**, 985–996.
- Meju, M. A. (2009). Regularised extremal bounds analysis (REBA): An approach to quantifying uncertainty in nonlinear geophysical inverse problems. *Geophys. Res. Lett.* **36**, doi:10.1029/2008GL036407.
- Meju, M. A. and V. Sakkas (2007). Heterogeneous crust and upper mantle across southern Kenya and the relationship to surface deformation as inferred from magnetotelluric imaging. *J. Geophys. Res.* **112**, doi:10.1029/2005JB004028.
- Meles, G. A., J. van der Kruk, S. A. Greenhalgh, J. R. Ernst, H. Maurer, and A. G. Green (2010). A new vector wave-form inversion algorithm for simultaneous updating of conductivity and permittivity parameters from combination of crosshole/borehole-to-surface GPR data. *IEEE Trans. Geosc. Rem. Sens.* **48**, 3391–3407.
- Melo, G., A. Malcolm, D. Mikesell, and K. van Wijk (2013). Using SVD for improved interferometric Green's function retrieval. *Geophys. J. Int.* **1596–1612**.
- Meltzer, A., R. Rudnick, P. Zeitler, A. Levander, G. Humphreys, K. Karlstrom, G. Ekström, R. Carlson, T. Dixon, M. Gurnis, P. Shearer, and R. D. van der Hilst (1999). USArray initiative. *GSA Today* **8-10**.
- Menke, W. (2012). *Geophysical data analysis: Discrete inverse theory*. Academic Press.
- Menon, R., P. Gerstoft, and W. S. Hodgkiss (2012). Cross-correlations of diffuse noise in an ocean environment using eigenvalue based statistical inference. *J. Acoust. Soc. Am.* **132**, 3213–3224.
- Mercerat, E. D. and G. Nolet (2012). Comparison of ray- and adjoint-based sensitivity kernels for body wave seismic tomography. *Geophys. Res. Lett.* **in press**, doi:10.1029/2012GL052002.
- Merilees, P. (1973). The pseudospectral approximation applied to shallow water equations on a sphere. *Atmosphere* **11**, 13–20.
- Merilees, P. (1974). Numerical experiments with the pseudospectral method in spherical coordinates. *Atmosphere* **12**, 77–96.
- Meschede, M. and B. Romanowicz (2015). Non-stationary spherical random media and their effect on long-period mantle waves. *Geophys. J. Int.* **203**, 1605–1625.
- Métivier, L. and R. Brossier (2016). The SEISCOPE optimization toolbox: A large-scale nonlinear optimization library based on reverse communication. *Geophysics* **81**, F1–F15.
- Métivier, L., R. Brossier, Q. Méridot, E. Oudet, and J. Virieux (2016). Measuring the misfit between seismograms using an optimal transport distance: application to full waveform inversion. *Geophys. J. Int.* **205**, 345–377.
- Metropolis, N. (1987). The beginning of the Monte Carlo method. *Los Alamos Science Special Issue*, 125–130.
- Metropolis, N., A. W. Rosenbluth, M. N. Rosenbluth, A. H. Teller, and E. Teller (1953). Equations of state calculations by fast computing machines. *J. Chem. Phys.* **21**, 1087–1092.
- Michea, D. and D. Komatitsch (2010). Accelerating a three-dimensional finite-difference wave propagation code using gpu graphics cards. *Geophys. J. Int.* **182**, 389–402.
- Miller, M., B. Kennett, and A. Gorbatov (2006). Morphology of the distorted subducted Pacific slab beneath the Hokkaido corner, Japan. *Phys. Earth Planet. Inter.* **156:1-2**, 1–11.
- Millot-Langet, R., E. Clévéde, and P. Lognonné (2003). Normal modes and long period seismograms in a 3D anelastic elliptical rotating Earth. *Geophys. Res. Lett.* **30(5)**.
- Minster, J. B. and T. H. Jordan (1978). Present-day plate motion. *J. Geophys. Res.* **83**, 5331–5354.
- Mitchell, J. B. (1995). Anelastic structure and evolution of the continental crust and upper mantle from seismic surface wave attenuation. *Rev. Geophys.* **33**, 441–462.
- Mittler, J. E., B. Sulzer, A. U. Neumann, and A. S. Perelson (1998). Influence of delayed viral production on viral dynamics in hiv-1 infected patients. *Mathematical biosciences* **152(2)**, 143–163.
- Miyashiro, A. (1986). Hot regions and the origin of marginal basins in the western Pacific. *Tectonophysics* **122**, 195–216.
- Mochizuki, E. (1986). Free oscillations and surface waves of an aspherical Earth. *Geophys. Res. Lett.* **13**, 1478–1481.
- Moczo, P. and J. Kristek (2005). On the rheological models for time-domain methods of seismic wave propagation. *Geophys. Res. Lett.* **32**, doi:10.1029/2004GL021598.
- Moczo, P., J. Kristek, and M. Galis (2014). *The finite-difference modelling of earthquake motions: waves and ruptures*. Cambridge University Press.
- Moczo, P., J. Kristek, and L. Halada (2000). 3D fourth-order staggered-grid finite-difference schemes: stability and grid dispersion. *Bull. Seis. Soc. Am.* **90**, 587–603.
- Moczo, P., J. Kristek, V. Vavrycuk, R. Archuleta, and L. Halada (2002). 3D heterogeneous staggered-grid finite-difference modeling of seismic motion with volume harmonic and arithmetic averaging of elastic moduli. *Bull. Seis. Soc. Am.* **92**, 3042–3066.
- Modrak, R. and J. Tromp (2016). Seismic waveform inversion best practices: regional, global and exploration test cases. *Geophys. J. Int.* **206**, 1864–1889.
- Molinari, I. and A. Morelli (2011). EPcrust: a reference crustal model for the European Plate. *Geophys. J. Int.* **185**, 352–364.
- Montagner, J. P. (1994). What can seismology tell us about mantle convection? *Rev. Geophys.* **32,2**, 115–137.
- Montagner, J. P. (1996). Surface waves on a global scale - influence of anisotropy and anelasticity. In Boschi, Ekstrom, and Morelli (Eds.), *Summer School of Erice, Seismic Modeling of the Earth's structure*, pp. 81–148.
- Montagner, J. P. and D. L. Anderson (1989). Petrological constraints on seismic anisotropy. *Phys. Earth Planet. Inter.* **54**, 82–105.
- Montagner, J. P. and N. Jobert (1988). Vectorial tomography -II. Application to the Indian Ocean. *Geophys. J.* **94**, 309–344.
- Montagner, J. P. and B. Romanowicz (1993). Degrees 2, 4, 6 Inferred from Seismic Tomography. *Geophys. Res. Lett.* **20**, 631–634.
- Montagner, J.-P., E. Stutzmann, and Y. Capdeville (1995). Hotspot detection from seismological data. In D. Anderson, S. Hart, and A. Hofmann (Eds.), *Plume 2, Terra Nostra*, Volume 3, pp. 103–106.

- Monteiller, V., S. Chevrot, D. Komatitsch, and N. Fuji (2012). A hybrid method to compute short-period synthetic seismograms of teleseismic body waves in a 3-D regional model. *Geophys. J. Int.* **192**, 230–247.
- Montelli, R., G. Nolet, F. Dahlen, and G. Masters (2006). A catalogue of deep mantle plumes: New results from finite-frequency tomography. *Geochem. Geophys. Geosyst.* **7:11**, doi:10.1029/2006GC001248.
- Montelli, R., G. Nolet, F. Dahlen, G. Masters, E. Engdahl, and S. Hung (2004). Finite-frequency tomography reveals a variety of mantle plumes. *Science* **303**, 338–343.
- Montelli, R., G. Nolet, G. Masters, F. A. Dahlen, and S.-H. Hung (2004). Global P and PP traveltimes tomography: ray versus waves. *Geophys. J. Int.* **158**, 637–654.
- Mora, P. (1987). Nonlinear two-dimensional elastic inversion of multioffset seismic data. *Geophysics* **52**, 1211–1228.
- Mora, P. (1988). Elastic wave-field inversion of reflection and transmission data. *Geophysics* **53**, 750–759.
- Mora, P. (1989). Inversion=migration+tomography. *Geophysics* **54**, 1575–1586.
- Mordret, A., M. Landès, N. Shapiro, S. Singh, and P. Roux (2014). Ambient noise surface wave tomography to determine the shallow shear velocity structure at valhall: depth inversion with a neighbourhood algorithm. *Geophysical Journal International* **198**(3), 1514–1525.
- Mordret, A., M. Landès, N. Shapiro, S. Singh, P. Roux, and O. Barkved (2013). Near-surface study at the valhall oil field from ambient noise surface wave tomography. *Geophysical Journal International*, ggt061.
- Mordret, A., N. Shapiro, and S. Singh (2014). Seismic noise-based time-lapse monitoring of the Valhall overburden. *Geophys. Res. Lett.* **41**, 4945–4952.
- Morelli, A. and A. Dziewoński (1993). Body wave traveltimes and a spherically symmetric P- and S- wave velocity model. *Geophys. J. Int.* **112**, 178–194.
- Morelli, A., A. Dziewoński, and J. H. Woodhouse (1986). Anisotropy of the inner core inferred from PKIKP travel times. *Geophys. Res. Lett.* **13**, 1545–1548.
- Morgan, W. (1971). Convection plumes in the lower mantle. *Nature* **230**, 42–43.
- Mori, J. and D. Helmberger (1995). Localized boundary layer below the mid-Pacific velocity anomaly identified from PcP precursor. *J. Geophys. Res.* **100**, 20359–20365.
- Morozova, E. A., I. B. Morozov, S. B. Smithson, and L. N. Solodilov (1999). Heterogeneity of the uppermost mantle beneath Russian Eurasia from the ultra-long profile QUARTZ. *J. Geophys. Res.* **104**, 20329–20348.
- Morris, P. (1995). Slab melting as an explanation of Quaternary volcanism and aseismicity in southwest Japan. *Geology* **23:5**, 395–398.
- Mosca, I., L. Cobden, A. Deuss, J. Ritsema, and J. Trampert (2012). Seismic and mineralogical structures of the lower mantle from probabilistic tomography. *J. Geophys. Res.* **117**, doi:10.1029/2011JB008851.
- Mosegaard, K. (2012). *Limits to nonlinear inversion*, pp. 11–21. Springer, Berlin, Heidelberg.
- Mosegaard, K. and A. Tarantola (1995). Monte Carlo sampling of solutions to inverse problems. *J. Geophys. Res.* **100**, 12431–12447.
- Motoki, M. and M. Ballmer (2015). Intraplate volcanism due to convective instability of stagnant slabs in the mantle transition zone. *Geochem. Geophys. Geosyst.* **16**, 538–551.
- Muir, J. B. and H. Tkalčić (2015). Probabilistic joint inversion of lowermost mantle P-wave velocities and core mantle boundary topography using differential travel times and hierarchical Hamiltonian Monte-Carlo sampling. In *AGU 2015 Fall meeting*, pp. S14A–03. AGU.
- Muir, J. B. and H. Tkalčić (2020). Probabilistic lowermost mantle P-Wave tomography from hierarchical Hamiltonian Monte Carlo and model parametrization cross-validation. *Geophys. J. Int.*, under review.
- Mulargia, F. (2012). The seismic noise wavefield is not diffuse. *J. Acoust. Soc. Am.* **131**, 2853–2858.
- Mustać, M. and H. Tkalčić (2016). Point source moment tensor inversion through a Bayesian hierarchical model. *Geophys. J. Int.* **204**, 311–323.
- Nakahigashi, K., M. Shinohara, T. Yamada, K. Uehira, S. Sakai, K. Mochizuki, H. Shiobara, and T. Kanazawa (2015). Deep slab dehydration and large-scale upwelling flow in the upper mantle beneath the Japan Sea. *J. Geophys. Res. Solid Earth* **120**, 3278–3292.
- Nakajima, J. and A. Hasegawa (2007). Tomographic evidence for the mantle upwelling beneath southwestern Japan and its implications for arc magmatism. *Earth Planet. Sci. Lett.* **254:1-2**, 90–105.
- Nakata, N., J. P. Chang, J. F. Lawrence, and P. Boué (2015). Body wave extraction and tomography at Long Beach, California, with ambient-noise interferometry. *J. Geophys. Res.* **120**, 1159–1173.
- Nakata, N., L. Gualtieri, and A. Fichtner (2019). *Seismic Ambient Noise*. Cambridge University Press.
- Nakata, N. and K. Nishida (2019). Body wave exploration. In N. Nakata, L. Gualtieri, and A. Fichtner (Eds.), *Seismic Ambient Noise*, pp. 218–238. Cambridge University Press, Cambridge, U.K.
- Nataf, H. C. and Y. Ricard (1996). 3SMAC: an a priori tomographic model of the upper mantle based on geophysical modelling. *Phys. Earth. Planet. Int.* **95**, 101–122.
- Nataf, H. C. and T. Vandecar (1993). Seismological detection of mantle plume? *Nature* **364**, 115–120.
- Nawa, K., N. Suda, Y. Fukao, T. Sato, Y. Aoyama, and K. Shibuya (1998). Incessant excitation of the Earth's free oscillations. *Earth Planets Space* **50**, 3–8.
- Neal, R. M. (1996). *Bayesian learning for neural networks*. Springer, New York.
- Neal, R. M. (2011). MCMC using Hamiltonian dynamics. In *Handbook of Markov Chain Monte Carlo*, pp. Chapter 5.
- Nemeth, T., C. Wu, and G. T. Schuster (1999). Least-squares migration of incomplete reflection data. *Geophysics* **64**, 208–221.
- Nettles, M. and A. M. Dziewoński (2008). Radially anisotropic shear velocity structure of the upper mantle globally and beneath North America. *J. Geophys. Res.* **113**, doi:10.1029/2006JB004819.

- Ni, S. and D. V. Helmberger (2000). Horizontal transition from fast (slab) to slow (plume) structures at the core-mantle boundary. *Earth Planet. Sci. Lett.*. submitted.
- Nielsen, L., H. Thybo, A. Levander, and N. Solodilov (2003). Origin of upper mantle seismic scattering - evidence from Russian peaceful nuclear explosion data. *Geophys. J. Int.* **154**, 196–204.
- Nishida, K. (2011). Two-dimensional sensitivity kernels for cross-correlation functions of background surface waves. *Comptes Rendus - Geoscience* **343**, 584–590.
- Nishida, K. (2013). Global propagation of body waves revealed by cross-correlation analysis of seismic hum. *Geophys. Res. Lett.* **40**, 1691–1696.
- Nishida, K. (2014). Source spectra of seismic hum. *Geophys. J. Int.* **199**(1), 416–429.
- Nishida, K. and Y. Fukao (2007). Source distribution of Earth's background free oscillations. *J. Geophys. Res.* **112**.
- Nishida, K. and J.-P. Montagner (2009). Global surface wave tomography using seismic hum. *Science* **326**, 5949.
- Nissen-Meyer, T., F. A. Dahlen, and A. Fournier (2007). Spherical Earth Fréchet sensitivity kernels. *Geophys. J. Int.* **168**, 1051–1066.
- Nissen-Meyer, T., A. Fournier, and F. A. Dahlen (2007). A two-dimensional spectral-element method for computing spherical-earth seismograms - i. moment-tensor source. *Geophys. J. Int.* **168**, 1067–1092.
- Nissen-Meyer, T., A. Fournier, and F. A. Dahlen (2008). A two-dimensional spectral-element method for computing spherical-earth seismograms - ii. waves in solid-fluid media. *Geophys. J. Int.* **174**, 873–888.
- Nissen-Meyer, T., M. van Driel, S. Stähler, K. Hosseini, S. Hempel, L. Auer, and A. Fournier (2014). AxiSEM: broadband 3-D seismic wavefields in axisymmetric media. *Solid Earth* **5**, 425–445.
- Nocedal, J. (1980). Updating quasi-Newton matrices with limited storage. *Math. Comp.* **35**, 773–782.
- Nocedal, J. and S. J. Wright (1999). *Numerical Optimization*. Springer, New York.
- Nolet, G. (1990). Partitioned waveform inversion and two-dimensional structure under the Network of Autonomously Recording Seismographs. *J. Geophys. Res.* **95**, 8499–8512.
- Nolet, G. (2008). *A breviary of seismic tomography*. Cambridge University Press, Cambridge, UK.
- Nolet, G. and R. Montelli (2005). Optimal parametrization of tomographic models. *Geophys. J. Int.* **161**, 365–372.
- Nolet, G., R. Montelli, and J. Virieux (1999). Explicit, approximate expressions for the resolution and a posteriori covariance of massive tomographic systems. *Geophys. J. Int.* **138**, 36–44.
- Obayashi, M., H. Sugioka, J. Yoshimitsu, and Y. Fukao (2006). High temperature anomalies oceanward of subducting slabs at the 410-km discontinuity. *Earth Planet. Sci. Lett.* **243:1-2**, 149–158.
- Obermann, A., B. Froment, M. Campillo, E. Larose, T. Planes, B. Valette, J.-H. Chen, and Q. Y. Liu (2014). Seismic noise correlations to image structural and mechanical changes associated with the Mw 7.9 2008 Wenchuan earthquake. *J. Geophys. Res.* **119**, doi:10.1002/2013JB010932.
- Obermann, A., T. Kraft, E. Larose, and S. Wiemer (2015). Potential of ambient seismic noise techniques to monitor the St. Gallen geothermal site (Switzerland). *J. Geophys. Res.* **120**, doi:10.1002/2014JB011817.
- Obermann, A., T. Planes, E. Larose, and M. Campillo (2013). Imaging preeruptive and coeruptive structural and mechanical changes of a volcano with ambient seismic noise. *J. Geophys. Res.* **118**, 1–10.
- Okay, A. I. and O. Tüysüz (1999). Tethyan sutures of northern Turkey. *Geol. Soc. London, Special Publication* **156**, 475–515.
- Olinger, S. D., B. P. Lipovsky, M. A. Denolle, and B. W. Crowell (2022). Tracking the cracking: a holistic analysis of rapid ice shelf fracture using seismology, geodesy, and satellite imagery on the Pine Island Glacier Ice Shelf, West Antarctica. *Earth Space Sci. Open Arch.*, doi:10.1002/essoar.10510107.
- Olson, P., G. Scubert, and C. Snderson (1987). Plume formation in the D" layer and the roughness of the core-mantle boundary. *Nature* **327**, 409–413.
- Omori, S. and T. Komabayashi (2007). Subduction zone: The water channel to the mantle. In D. Yuen, S. Maruyama, S.-I. Karato, and B. Windley (Eds.), *Superplumes: Beyond Plate Tectonics*, pp. 113–138. Springer.
- Onarheim, I. H., L. H. Smedsrud, R. B. Ingvaldsen, and F. Nilsen (2014). Loss of sea ice during winter north of Svalbard. *Tellus A: Dynamic Meteorology and Oceanography* **66**(1), 23933.
- Operto, S., C. Ravaut, L. Importa, J. Virieux, A. Herrero, and P. Dell'Aversana (2004). Quantitative imaging of complex structures from dense wide-aperture seismic data by multi-scale traveltimes and waveform inversion: a case study. *Geophys. Prosp.* **52**, 625–651.
- Operto, S., J. Virieux, A. Ribodetti, and J. E. Anderson (2009). Finite-difference frequency-domain modeling of viscoacoustic wave propagation in 2D tilted transversely isotropic (TTI) media. *Geophysics* **74**, T75–T95.
- Orszag, S. (1980). Spectral methods for problems in complex geometries. *J. Comp. Phys.* **37**, 70–92.
- O'Toole, T. B., A. P. Valentine, and J. H. Woodhouse (2012). Centroid-moment tensor inversions using high-rate GPS waveforms. *Geophys. J. Int.* **191**, 257–270.
- Owen, A., G. Duckworth, and J. Worsley (2012). Fibre-optic distributed acoustic sensing for border monitoring. In *2012 European Intelligence and Security Informatics Conference*, pp. doi:10.1109/EISIC.2012.59.
- Öztürk, S., M. Destur, and M. Karlı (2006). Heat flow map of Turkey, 1:2,000,000. *General Directorate of Mineral Research and Exploration, Department of Geophysical Exploration, Ankara, Turkey*.
- Paitz, P., P. Edme, D. Gräff, F. Walter, J. Doetsch, A. Chalari, C. Schmelzbach, and A. Fichtner (2021). Empirical investigations of the instrument response for distributed acoustic sensing (DAS) across 17 octaves. *Bull. Seis. Soc. Am.* **111**, 1–10.
- Paitz, P., K. Sager, and A. Fichtner (2019). Rotation and strain ambient noise interferometry. *Geophys. J. Int.* **216**, 1938–1952.
- Pankajakshan, P., B. Zhang, L. Blanc-Feraud, Z. Kam, J. C. Olivio-Marin, and J. Zerubia (2000). Blind deconvolution for thin-layered confocal imaging. *Appl. Optics* **48**, 4437–4448.
- Panning, M. and B. Romanowicz (2006). A three-dimensional radially anisotropic model of shear velocity in the whole mantle. *Geophys. J. Int.* **167**, 361–379.
- Park, C. H., J. W. Kim, N. Isezaki, D. R. Roman, and R. R. B. von Frese (2006). Crustal analysis of the Ulleung Basin in the East

- Sea (Japan Sea) from enhanced gravity mapping. *Mar. Geophys. Res.* **27**, 253–266.
- Park, J. (1986). Synthetics seismograms from coupled free oscillations: the effects of lateral structure and rotations. *J. Geophys. Res.* **91**, 6441–6464.
- Park, J. (1987). Asymptotic coupled-mode expressions for multiplet amplitude anomalies and frequency shifts on a laterally heterogeneous Earth. *Geophys. J. R. Astr. Soc.* **90**, 129–170.
- Park, J. (1989). Roughness constrains in surface wave tomography. *Geophys. Res. Lett.* **16**, 1329–1332.
- Park, J. (1990). Radial mode observation from the 5/23/89 Macquarie ridge earthquake. *Geophys. Res. Lett.* **17**, 1005–1008.
- Park, J. and F. Gilbert (1986). Coupled free oscillations of an aspherical dissipative rotating Earth: Galerkin theory. *J. Geophys. Res.* **91**, 7241–7260.
- Park, J. and Y. Yu (1992). Anisotropy and coupled free oscillations: simplified models and surface wave observations. *Geophys. J. Int.* **110**, 401–420.
- Parker, R. L. (1977). Understanding inverse theory. *Ann. Rev. Earth Planet. Sci.* **5**, 35–64.
- Parker, R. L. (1994). *Geophysical Inverse Theory*. Princeton University Press, Princeton, USA.
- Parsons, T., S. Toda, R. S. Stein, A. A. Barka, and J. H. Dieterich (2000). Heightened odds of large earthquakes near Istanbul: An interaction-based probability calculation. *Science* **288**, 661–665.
- Passier, M. L. and R. K. Snieder (1995). Using differential waveform data to retrieve local S velocity structure or path-averaged S velocity gradients. *J. Geophys. Res.* **100**, 24061–24078.
- Patera, A. T. (1984). A spectral element method for fluid dynamics: laminar flow in a channel expansion. *J. Comput. Phys.* **54**, 468–488.
- Pau, A. K. and J. M. George (2014). Antiretroviral therapy: current drugs. *Infectious Disease Clinics* **28**(3), 371–402.
- Pavese, A., G. Artioli, and M. Prencipe (1995). X-ray single-crystal diffraction study of pyrope in the temperature range 30–973 K. *Am. Mineral.* **80**, 457–464.
- Pearson, J. D. (1969). Variable metric methods of minimisation. *Comp. J.* **12**, 171–178.
- Pedersen, H. A. (2006). Impacts of non-plane waves on two-station measurements of phase velocities. *Geophys. J. Int.* **65**, 279–287.
- Perelson, A. S., D. E. Kirschner, and R. De Boer (1993). Dynamics of HIV infection of CD4+ T cells. *Mathematical Biosciences* **114**(1), 81–125.
- Perovich, D. K. and B. Elder (2002). Estimates of ocean heat flux at SHEBA. *Geophysical Research Letters* **29**(9), 58–1.
- Perovich, D. K., B. Light, H. Eicken, K. F. Jones, K. Runciman, and S. V. Nghiem (2007). Increasing solar heating of the Arctic Ocean and adjacent seas, 1979–2005: Attribution and role in the ice-albedo feedback. *Geophysical Research Letters* **34**(19).
- Peter, D., L. Boschi, F. Deschamps, B. Fry, G. Ekström, and D. Giardini (2008). A new finite-frequency shear-velocity model of the European-Mediterranean region. *Geophys. Res. Lett.* **35**, doi:10.1029/2008GL034769.
- Peter, D., L. Boschi, and J. H. Woodhouse (2009). Tomographic resolution of ray and finite-frequency methods: a membrane-wave investigation. *Geophys. J. Int.* **177**, 624–638.
- Peter, D., D. Komatitsch, Y. Luo, R. Martin, N. Le Goff, E. Casarotti, P. Le Locher, F. Magnoni, Q. Liu, C. Blitz, T. Nissen-Meyer, P. Basini, and J. Tromp (2011). Forward and adjoint simulations of seismic wave propagation on fully unstructured hexahedral meshes. *Geophys. J. Int.* **186**, 721–739.
- Peter, D., C. Tape, L. Boschi, and J. H. Woodhouse (2007). Surface wave tomography: global membrane waves and adjoint methods. *Geophys. J. Int.* **171**, 1098–1117.
- Peterson, J. (1993). Observations and modeling of seismic background noise. *USGS Open File Report* **93-322**, 94 pp.
- Phinney, R. A. and R. Burridge (1973). Representation of elastic-gravitational excitation of a spherical earth model by generalized spherical harmonics. *Geophys. J. R. Astron. Soc.* **34**, 451–278.
- Planes, T., E. Larose, L. Margerin, V. Rosetto, and C. Sens-Schönfelder (2015). Decorrelation and phase shift of coda waves induced by local changes: multiple scattering approach and numerical validation. *Waves in Random and Complex Media* **24**:2, 99–125.
- Plessix, R.-E. (2006). A review of the adjoint-state method for computing the gradient of a functional with geophysical applications. *Geophys. J. Int.* **167**, 495–503.
- Podvin, P. and I. Lecomte (1991). Finite difference computation of traveltimes in very contrasted velocity models: a massively parallel approach and its associated tools. *Geophys. J. Int.* **105**, 271–284.
- Poincaré, H. (1890). Sur le problème des trois corps et les équations de la dynamique. *Acta Math.* **13**, 1–270.
- Polak, E. and G. Ribière (1969). Note sur la convergence de la méthode de directions conjuguées. *Revue Fr. Inf. Rech. Oper.* **16-R1**, 35–43.
- Poli, P., M. Campillo, H. Pedersen, and LAPNET Working Group (2012). Body-wave imaging of Earth’s mantle discontinuities from ambient seismic noise. *Science* **338**, 1063–1065.
- Poli, P., C. Thomas, M. Campillo, and H. Pedersen (2015). Imaging the D” reflector with noise correlations. *Geophys. Res. Lett.* **42**, 60–65.
- Pollitz, F. (1992). Propagation of surface waves on a laterally heterogeneous Earth: asymptotic solution of the two dimensional wave equation. *Geophys. J. Int.* **111**, 67–78.
- Pollitz, F. (1994). Surface wave scattering from sharp lateral discontinuities. *J. Geophys. Res.* **99**, 21891–21909.
- Pollitz, F. (1998). Scattering of spherical elastic waves from small-volume spherical inclusion. *Geophys. J. Int.* **134**, 390–408.
- Poore, H. R., N. J. White, and J. MacLennan (2011). Ocean circulation and mantle melting controlled by radial flow of hot pulses in the Iceland plume. *Nat. Geosc.* **4**, 558–561.
- Popovici, A. M. and J. A. Sethian (2002). 3-d imaging using higher-order fast-marching traveltimes. *Geophysics* **67**(2), 604–609.
- Popper, K. (1935). *Logik der Forschung. Zur Erkenntnistheorie der modernen Naturwissenschaft*. Springer.
- Porter, C., P. Morin, I. Howat, M.-J. Noh, B. Bates, K. Peterman, S. Keeseey, M. Schlenk, J. Gardiner, K. Tomko, M. Willis, C. Kelleher, M. Cloutier, E. Husby, S. Foga, H. Nakamura, M. Platson, J. Wethington, Michael, C. Williamson, G. Bauer, J. Enos, G. Arnold, W. Kramer, P. Becker, A. Doshi, C. D’Souza, P. Cummins, F. Laurier, and M. Bojesen (2018). ArcticDEM.
- Postma, G. W. (1955). Wave propagation in a stratified medium. *Geophysics* **20**, 780–808.

- Postpischl, L., P. Danecek, A. Morelli, and S. Pondrelli (2011). Standardisation of seismic tomographic models and earthquake focal mechanisms data sets based on web technologies, visualisation with keyhole markup language. *Comp. Geosc.* **37**, 47–56.
- Pouliquen, O. and Y. Forterre (2009). A non-local rheology for dense granular flows. *Phil. Trans. Roy. Soc. A* **367**, 5091–5107.
- Poulton, M. (2001). *Computational neural networks for geophysical data processing*. Elsevier.
- Pratt, R., C. Shin, and G. Hicks (1998). Gauss-Newton and full Newton methods in frequency domain seismic waveform inversion. *Geophys. J. Int.* **133**, 341–362.
- Pratt, R. G. (1999). Seismic waveform inversion in the frequency domain, part 1: Theory and verification in a physical scale model. *Geophysics* **64**, 888–901.
- Pratt, R. G., L. Huang, N. Duric, and P. Littrup (2007). Sound-speed and attenuation imaging of breast tissue using waveform tomography of transmission ultrasound data. *SPIE Medical Imaging 2007*, 1523 – 1534.
- Press, F. (1968). Earth models obtained by Monte-Carlo inversion. *J. Geophys. Res.* **73**, 5223–5234.
- Press, F. (1970). Earth models consistent with geophysical data. *Phys. Earth Planet. Int.* **3**, 3–22.
- Press, F. and M. Ewing (1951). Propagation of elastic waves in a floating ice sheet. *Trans. Am. Geophys. Union* **32**, 673–678.
- Priestley, K. and D. McKenzie (2006). The thermal structure of the lithosphere from shear wave velocities. *Earth Planet. Sci. Lett.* **244**, 285–301.
- Prieto, G. A., M. Denolle, J. F. Lawrence, and G. C. Beroza (2011). On amplitude information carried by the ambient seismic field. *C. R. Geoscience* **343**, 600–614.
- Prieux, V., R. Brossier, S. Operto, and J. Virieux (2013). Multiparameter full waveform inversion of multicomponent ocean-bottom-cable data from the Valhall field. Part 1: Imaging compressional wave speed, density and attenuation. *Geophys. J. Int.* **194**, 1640–1664.
- Priolo, E., J. M. Carcione, and G. Seriani (1994). Numerical simulation of interface waves by high-order spectral modeling techniques. *J. Acoust. Soc. Am.* **95**:2, 681–693.
- Pulliam, J. and M. Sen (1999). Seismic anisotropy in the core-mantle transition. *Geophys. J. Int.*
- Pulliam, R., D. Vasco, and L. Johnson (1993). Tomography inversions for mantle P wave velocity structure based on the minimization of  $l^2$  and  $l^1$  norms of International Seismological Centre travel time residuals. *J. Geophys. Res.* **98**, 699–734.
- Qi, Y. and T. P. Minka (2002). Hessian-based Markov chain Monte Carlo algorithms. In *First Cape Cod Workshop on Monte Carlo Methods*.
- Quarteroni, A., R. Sacco, and F. Saleri (2000). *Numerical Mathematics*. Springer, New York.
- Quispel, G. R. W. and D. I. McLaren (2008). A new class of energy-preserving numerical integration methods. *J. Phys. A* **41**, doi:10.1088/1751-8113/41/4/045206.
- Radon, J. (1917). Über die bestimmung von funktionen durch ihre integralwerte längs gewisser mannigfaltigkeiten. *Berichte über die Verhandlungen der Königlich-Sächsischen Akademie der Wissenschaften zu Leipzig, Mathematisch-Physische Klasse* **69**, 262–277.
- Raftery, A. E. and S. Lewis (1992). How many iterations in the gibbs sampler? *Bayesian Stat.* **4**, 763–773.
- Randall, M. J. and L. Knopoff (1970). The mechanism at the focus of deep earthquakes. *J. Geophys. Res.* **75**, 4965–4976.
- Rančić, M., R. Purser, and F. Mesinger (1996). A global shallow-water model using expanded spherical cube: Gnomonic versus conformal coordinates. *Quart. J. Roy. Met. Soc.* **122**, 959.
- Rastrigin, L. A. (1974). *Systems of extremal control*. Nauka, Moscow.
- Raterron, P., E. Amiguet, J. Chen, L. Li, and P. Cordier (2009). Experimental deformation of olivine single crystals at mantle pressures and temperatures. *Phys. Earth Planet. Int.* **172**, 74–83.
- Ravaut, C., S. Operto, L. Importa, J. Virieux, A. Herrero, and P. dell'Aversana (2004). Multi-scale imaging of complex structures from multi-fold wide-aperture seismic data by frequency-domain full-wavefield inversions: Application to a thrust belt. *Geophys. J. Int.* **159**, 1032–1056.
- Rawlinson, N., A. Fichtner, M. Sambridge, and M. K. Young (2014). Seismic tomography and the assessment of uncertainty. *Advances in Geophysics* **55**, 1–76.
- Rawlinson, N. and B. L. N. Kennett (2009). Teleseismic tomography of the upper mantle beneath the southern Lachlan Orogen, Australia. *Physics Earth Planet. Int.* **167**(1–2), 84–97.
- Rawlinson, N., B. L. N. Kennett, E. Vanacore, R. A. Glen, and S. Fishwick (2011). The structure of the upper mantle beneath the Delamerian and Lachlan orogens from simultaneous inversion of multiple teleseismic datasets. *Gondwana Research* **19**(3), 788–799.
- Rawlinson, N., S. Pogany, and S. Fishwick (2010). Seismic tomography: A window to the deep Earth. *Phys. Earth Planet. Int.* **178**, 101–135.
- Rawlinson, N., A. M. Reading, and B. L. N. Kennett (2006). Lithospheric structure of Tasmania from a novel form of teleseismic tomography. *J. Geophys. Res.* **111**, doi: 10.1029/2005JB003803.
- Rawlinson, N. and M. Sambridge (2004a). Multiple reflection and transmission phases in complex layered media using a multistage fast marching method. *Geophysics* **69**(5), 1338–1350.
- Rawlinson, N. and M. Sambridge (2004b). Wave front evolution in strongly heterogeneous layered media using the fast marching method. *Geophys. J. Int.* **156**(3), 631–647.
- Rawlinson, N. and M. Urvoy (2006). Simultaneous inversion of active and passive source datasets for 3-d seismic structure with application to tasmania. *Geophys. Res. Lett.* **33**(24).
- Razafindrakoto, H. N. T. and P. M. Mai (2014). Uncertainty in earthquake source imaging due to variations in source time function and Earth structure. *Bull. Seis. Soc. Am.* **104**, 855–874.
- Reading, A. M., K. D. Koper, M. Gal, L. S. Graham, H. Tkalčić, and M. A. Hemer (2014). Dominant seismic noise sources in the southern ocean and west pacific, 2000–2012, recorded at the warramunga seismic array, australia. *Geophys. Res. Lett.* **41**(10), 3455–3463.
- Reid, F. J. L., J. H. Woodhouse, and H. J. van Heijst (2001). Upper mantle attenuation and velocity structure from measurements of differential S phases. *Geophys. J. Int.* **145**, 615–630.
- Reshef, M., D. Kosloff, M. Edwards, and C. Hsiung (1988). Three-dimensional elastic modeling by the Fourier method. *Geophysics* **53**, 1184–1193.

- Resovsky, J. and M. Ritzwoller (1999a). A degree 8 mantle shear velocity model from normal mode observations below 3 mHz. *J. Geophys. Res.* **104**, 993–1014.
- Resovsky, J. and M. Ritzwoller (1999b). Regularisation uncertainty in density models estimated from normal mode data. *Geophys. Res. Lett.* **26**, 2319–2322.
- Resovsky, J. and J. Trampert (2002). Reliable mantle density error bars: an application of the Neighbourhood Algorithm to normal-mode and surface wave data. *Geophys. J. Int.* **150**(3), 665–672.
- Resovsky, J. and J. Trampert (2003). Using probabilistic seismic tomography to test mantle velocity-density relationships. *Earth Planet. Sci. Lett.* **215**, 121–134.
- Resovsky, J., J. Trampert, and R. D. van der Hilst (2005). Error bars for the global seismic Q profile. *Earth Planet. Sci. Lett.* **230**, 413–423.
- Retailleau, L., P. Boué, L. Li, and M. Campillo (2020). Ambient seismic noise imaging of the lowermost mantle beneath the North Atlantic Ocean. *Geophys. J. Int.* **in press**, doi:10.1093/gji/gga210.
- Retailleau, L. and L. Gualtieri (2019). Toward high-resolution period-dependent seismic monitoring of tropical cyclones. *Geophys. Res. Lett.* **46**, 1329–1337.
- Revenaugh, J. and R. Meyer (1997). Seismic evidence of partial melt within a possibly ubiquitous low velocity layer at the base of the mantle. *Science* **277**, 670–673.
- Rhie, J. and B. Romanowicz (2006). A study of the relation between ocean storms and the Earth's hum. **7**(10), doi:10.1029/2006GC001274.
- Riahi, N., G. Bokelmann, P. Sala, and E. H. Saenger (2013). Time-lapse analysis of ambient surface wave anisotropy: A three-component array study above an underground gas storage. *J. Geophys. Res.* **118**, 5339–5351.
- Ribe, N. M. (1989). Seismic anisotropy and mantle flow. *J. Geophys. Res.* **94**, 4213–4223.
- Ricard, Y., M. Richards, C. Lithgow-Bertelloni, and Y. Le Stunff (1993). A geodynamic model of mantle density heterogeneity. *Journal of Geophysical Research* **98**(B12), 21–895.
- Richard, G. and D. Bercovici (2009). Water-induced convection in the Earth's mantle transition zone. *J. Geophys. Res.* **114**, doi:10.1029/2008JB005734.
- Richard, G. and H. Iwamori (2010). Stagnant slab, wet plumes and Cenozoic volcanism in East Asia. *Phys. Earth Planet. Inter.* **183**, 280–287.
- Rickers, F., A. Fichtner, and J. Trampert (2012). Imaging mantle plumes with instantaneous phase measurements of diffracted waves. *Geophys. J. Int.* **190**, 650–664.
- Rickers, F., A. Fichtner, and J. Trampert (2013). The Iceland - Jan Mayen plume system and its impact on mantle dynamics in the North Atlantic region: Evidence from full-waveform inversion. *Earth Planet. Sci. Lett.* **367**, 39–51.
- Rickett, J. and J. Claerbout (1999). Acoustic daylight imaging via spectral factorization: Helioseismology and reservoir monitoring. *The Leading Edge* **18**, 957–960.
- Rickett, J. and J. Claerbout (2000). Calculation of the Sun's acoustic impulse response by multi-dimensional spectral factorization. *Solar Physics* **192**, 203–210.
- Riedesel, M. A. and T. H. Jordan (1989). Display and assessment of seismic moment tensors. *Bull. Seis. Soc. Am.* **79**, 85–100.
- Rietmann, M., M. Grote, D. Peter, and O. Schenk (2017). Newmark local time stepping on high-performance computing architectures. *J. Comp. Phys.* **334**, 308–326.
- Rietmann, M., P. Messmer, T. Nissen-Meyer, D. Peter, P. Basini, D. Komatitsch, O. Schenk, J. Tromp, L. Boschi, and D. Giardini (2012). Forward and adjoint simulations of seismic wave propagation on emerging large-scale GPU architectures. In *International Conference for High Performance Computing, Networking, Storage and Analysis, SC*, pp. 10.1109/SC.2012.59. IEEE.
- Ripley, B. D. (1987). *Statistical Simulation*. Wiley, New York.
- Ritsema, J., A. Deuss, H. J. van Heijst, and J. H. Woodhouse (2011). S40RTS: a degree-40 shear-velocity model for the mantle from new Rayleigh wave dispersion, teleseismic traveltime and normal-mode splitting function measurements. *Geophys. J. Int.* **184**, 1223–1236.
- Ritsema, J., S. Ni, D. V. Helmberger, and H. P. Crotwell (1998). Anomalous shear velocity reductions and gradients in the lower mantle beneath Africa. *Geophys. Res. Lett.* **25**, 4245–4248.
- Ritsema, J. and H. J. van Heijst (2002). Constraints on the correlation of P- and S-wave velocity heterogeneity in the mantle from P, PP, PPP and PKPab traveltimes. *Geophys. J. Int.* **149**, 482–489.
- Ritsema, J., H. vanHeijst, and J. H. Woodhouse (1999). Complex shear wave velocity structure imaged beneath Africa and Iceland. *Science* **286**, 1925–1928.
- Ritzwoller, M. and E. Lavelly (1995). Three dimensional seismic models of the Earth's mantle. *Rev. Geophys.* **33**, 1–66.
- Ritzwoller, M. H. and L. Feng (2019). Overview of pre- and post-processing of ambient noise correlations. In N. Nakata, L. Gualtieri, and A. Fichtner (Eds.), *Seismic Ambient Noise*, pp. 144–187. Cambridge University Press, Cambridge, U.K.
- Riznichenko, J. V. (1949). On seismic anisotropy. *Izvestiya Akad. Nauk. SSSR, seria geograficheskaya i geoficheskaya* **13**, 518–544.
- Roberts, G. O. and R. L. Tweedie (1996). Exponential convergence of Langevin distributions and their discrete approximations. *Bernoulli* **2**, 341–363.
- Robertsson, J. (1996). A numerical free-surface condition for elastic/viscoelastic finite-difference modeling in the presence of topography. *Geophysics* **61**, 1921–1934.
- Robertsson, J. O. A., J. O. Blanch, and W. W. Symes (1994). Viscoelastic finite-difference modelling. *Geophysics* **59**, 1444–1456.
- Robin, L. (1958). *Fonctions sphériques de Legendre et fonctions sphéroïdales*. Gauthier Villars, Paris.
- Rokhlin, V., A. Szlam, and M. Tygert (2009). A randomized algorithm for principal component analysis. *SIAM J. Matrix Anal. Appl.* **31**, 1100–1124.
- Romanowicz, B. (1987). Multiplet–multiplet coupling due to lateral heterogeneity: asymptotic effects on the amplitude and frequency of the Earth's normal modes. *Geophys. J. R. Astron. Soc.* **90**, 75–100.
- Romanowicz, B. (1995). A global tomographic model of shear attenuation in the upper mantle. *J. Geophys. Res.* **100**, 12375–12394.
- Romanowicz, B. (2001). Can we resolve 3D density heterogeneity in the lower mantle? *Geophys. Res. Lett.* **28**, 1107–1110.

- Romanowicz, B. (2003). Global mantle tomography: progress status in the last 10 years. *Annu. Rev. Geoph. Space Phys* **31**, 303–28.
- Romanowicz, B. and B. J. Mitchell (2007). Deep Earth structure - Q of the Earth from Crust to Core. In G. Schubert (Ed.), *Treatise on Geophysics*, pp. 731–774. Elsevier.
- Romanowicz, B. and G. Roullet (1986). First order asymptotics for the eigenfrequencies of the Earth and application to the retrieval of large-scale variations of structure. *Geophys. J. R. Astr. Soc.* **87**, 209–240.
- Romanowicz, B. and R. Snieder (1988). A new formalism for the effect of lateral heterogeneity on normal modes and surface waves: II. General anisotropic perturbation. *Geophys. J. Int.* **93**, 91–99.
- Ronchi, C., R. Iacono, and P. S. Paolucci (1996). The ‘Cubed Sphere’: a new method for the solution of partial differential equations in spherical geometry. *J. Comput. Phys.* **124**, 93–114.
- Rong, L., Z. Feng, and A. S. Perelson (2007). Emergence of hiv-1 drug resistance during antiretroviral treatment. *Bulletin of Mathematical Biology* **69**(6), 2027–2060.
- Rosenberg, E. S., M. Davidian, and H. T. Banks (2007). Using mathematical modeling and control to develop structured treatment interruption strategies for hiv infection. *Drug and alcohol dependence* **88**, S41–S51.
- Rosenblueth, A. and N. Wiener (1945). The role of models in science. *Phil. Sci.* **12**, 316–321.
- Rosenbrock, H. H. (1960). An automatic method for finding the greatest or least value of a function. *Comp. J.* **3**, 175–184.
- Rosenthal, J. S. (2011). Optimal proposal distributions and adaptive MCMC. In *Handbook of Markov Chain Monte Carlo*, pp. Chapter 4.
- Roullet, G., D. Rouland, and J. P. Montagner (1994). Antarctica II: Upper-mantle structure from velocities and anisotropy. *Phys. Earth Planet. Inter.* **84**, 33–57.
- Roux, P. (2009). Passive seismic imaging with directive ambient noise: Application to surface waves and the San Andreas Fault in Parkfield, CA. *Geophys. J. Int.* **179**, 367–373.
- Roy, V. (2019). Convergence diagnostics for Markov chain Monte Carlo. *arXiv [stat.CO]*, 1909.11827v2.
- Ruan, Y. and Y. Zhou (2010). The effects of 3-D anelasticity (Q) structure on surface wave phase delays. *Geophys. J. Int.* **181**, 479–492.
- Rudin, W. (1966). *Real and complex analysis*. McGraw-Hill.
- Rudolph, G. (1990). *Globale Optimierung mit parallelen Evolutionsstrategien*. Diploma thesis, Universität Dortmund.
- Ruelas, D. S. and W. C. Greene (2013). An integrated overview of hiv-1 latency. *Cell* **155**(3), 519–529.
- Rüpke, L. H., J. P. Morgan, M. Hort, and J. A. Connolly (2004). Serpentine and the subduction zone water cycle. *Earth Planet. Sci. Lett.* **223**, 17–24.
- Ruth, R. (1983). A canonical integration technique. *IEEE Trans. Nucl. Sci.* **30**, 2669–2671.
- Rydberg, T., M. Tittgemeyer, and F. Wenzel (2000). Finite-difference modelling of P-wave scattering in the upper mantle. *Geophys. J. Int.* **141**, 787–800.
- Rytov, S. M. (1965). The acoustical properties of a finely layered medium. *Akust. Zhur.* **2**, 76–80.
- Sabra, K. G., P. Gerstoft, P. Roux, and W. A. Kuperman (2005). Surface wave tomography from microseisms in Southern California. *Geophys. Res. Lett.* **32**, doi:10.1029/2005GL023155.
- Sadourny, R. (1972). Conservative finite-difference approximations of the primitive equation on quasi-uniform spherical grids. *Mon. Weather Rev.* **100**, 136–144.
- Sager, K., C. Boehm, L. Ermert, L. Krischer, and A. Fichtner (2018). Sensitivity of seismic noise correlation functions to global noise sources. *J. Geophys. Res.* **123**, 6911–6921.
- Sager, K., C. Boehm, L. Ermert, L. Krischer, and A. Fichtner (2020). Global-scale full-waveform ambient noise inversion. *J. Geophys. Res.* **125**.
- Sager, K., L. Ermert, C. Boehm, and A. Fichtner (2018). Towards full waveform ambient noise inversion. *Geophys. J. Int.* **212**, 566–590.
- Saito, M. (1988). DISPER80: A subroutine package for the calculation of seismic normal-mode solutions. In D. J. Doornbos (Ed.), *Seismological algorithms*, pp. 294–319. Academic Press, New York.
- Salaün, G., H. A. Pedersen, A. Paul, V. Farra, H. Karabulut, D. Hatzfeld, C. Papazachos, D. M. Childs, C. Pequegnat, and the SIMBAAD Team (2012). High-resolution surface wave tomography beneath the Aegean-Anatolia region: constraints on upper-mantle structure. *Geophys. J. Int.* **190**, 406–420.
- Sambridge, M. S. (1999a). Geophysical inversion with the Neighbourhood Algorithm - I. Searching a parameter space. *Geophys. J. Int.* **138**, 479–494.
- Sambridge, M. S. (1999b). Geophysical inversion with the Neighbourhood Algorithm - II. Appraising the ensemble. *Geophys. J. Int.* **138**, 727–746.
- Sambridge, M. S. (2014). A parallel tempering algorithm for probabilistic sampling and multi-modal optimization. *Geophys. J. Int.* **196**, 357–374.
- Sambridge, M. S., T. Bodin, K. Gallagher, and H. Tkalcic (2013). Transdimensional inference in the geosciences. *Phil. Trans. R. Soc. A* **371**, doi:10.1098/rsta.2011.0547.
- Sambridge, M. S. and G. G. Drijkoningen (1992). Genetic algorithms in seismic waveform inversion. *Geophys. J. Int.* **109**, 323–342.
- Sambridge, M. S., K. Gallagher, A. Jackson, and P. Rickwood (2006). Trans-dimensional inverse problems, model comparison, and the evidence. *Geophys. J. Int.* **167**, 528–542.
- Sambridge, M. S. and K. Mosegaard (2002). Monte Carlo methods in geophysical inverse problems. *Rev. Geophys.* **40**, doi:10.1029/2000RG000089.
- Sambridge, M. S., A. Tarantola, and B. L. N. Kennett (1991). An alternative strategy for the non-linear inversion of seismic waveforms. *Geophys. Prosp.* **39**, 723–736.
- Samuelson, P. A. (1943). Fitting general Gram-Charlier series. *The Annals of Mathematical Statistics* **14**(2), 179–187.
- Sánchez-Sesma, F. J. and M. Campillo (1991). Diffraction of P, SV and Rayleigh waves by topographic features: a boundary integral formulation. *Bull. Seismol. Soc. Am.* **81**, 2234–2253.
- Sánchez-Sesma, F. J. and M. Campillo (2006). Retrieval of the Green’s function from cross correlation: The canonical elastic problem. *Bull. Seis. Soc. Am.* **96**, 1182–1191.
- Sánchez-Sesma, F. J. and R. Vai (1998). Absorbing boundaries in the frequency domain. In Irikura, K. and Okada, and Sasatani

- (Eds.), *The effects of surface Geology on Seismic Motion*, pp. 961–966. Balkema, Rotterdam.
- Santosa, F. (1982). Numerical scheme for the inversion of acoustic impedance profile based on the gelfand-levitan method. *Geophys. J. R. astr. Soc.* **70**, 229–243.
- Santosa, F. and W. W. Symes (1988). Computation of the Hessian for least-squares solutions of inverse problems of reflection seismology. *Inverse Problems* **4**, 211–233.
- Sanz-Serna, J. M. and M. P. Calvo (1994). *Numerical Hamiltonian problems*. Chapman and Hall, London, UK.
- Sargan, J. D. (1975). Gram-Charlier approximations applied to ratios of k-class estimators. *Econometrica* **43**, 327–347.
- Sauer, P. W. and G. T. Heydt (1979). Convenient multivariate Gram-Charlier type-A series. *IEEE Trans. Comm.* **27**, 247–248.
- Saunders, P., K. Priestley, and T. Taymaz (1998). Variations in the crustal structure beneath western Turkey. *Geophys. J. Int.* **134**, 373–389.
- Saxena, K. M. L. and K. Alam (1982). Estimation of the non-centrality parameter of a chi squared distribution. *Ann. Stat.* **10**, 1012–1016.
- Saygin, E. and B. L. N. Kennett (2012). Crustal structure of Australia from ambient seismic noise tomography. *J. Geophys. Res.* **117**, doi:10.1029/2011JB008403.
- Scales, J. A. and R. Snieder (1997). To Bayes or not to Bayes. *Geophysics* **62**, 1045–1046.
- Scales, J. A. and R. Snieder (2000). The anatomy of inverse problems. *Geophysics* **65**, 1045–1046.
- Schaeffer, A. J. and S. Lebedev (2013). Global shear speed structure of the upper mantle and transition zone. *Geophys. J. Int.* **194**, 417–449.
- Schäfer, J., L. Boschi, and E. Kissling (2011). Adaptively parametrized surface wave tomography: Methodology and a new model of the European upper mantle. *Geophys. J. Int.* **186**, 1431–1453.
- Schimmel, M. and H. Paulssen (1997). Noise reduction and detection of weak, coherent signals through phase-weighted stacks. *Geophys. J. Int.* **130**, 497–505.
- Schimmel, M., E. Stutzmann, and J. Gallart (2011). Using instantaneous phase coherence for signal extraction from ambient noise data at a local to a global scale. *Geophys. J. Int.* **184**, 494–506.
- Schimmel, M., E. Stutzmann, and S. Ventosa (2018). Low-frequency ambient noise autocorrelations: waveforms and normal modes. *Seis. Res. Lett.* **89**, 1488–1496.
- Schivardi, R. and A. Morelli (2011). Epmantle: a 3-D transversely isotropic model of the upper mantle under the European plate. *Geophys. J. Int.* **185**, 469–484.
- Schmidt, M. W. and S. Poli (1998). Experimentally based water budgets for dehydrating slabs and consequences for arc magma generation. *Earth Planet. Sci. Lett.* **163**, 361–379.
- Schulte-Pelkum, V. and Y. Ben-Zion (2012). Apparent vertical Moho offsets under continental strike-slip faults from lithology contrasts in the seismogenic crust. *Bull. Seis. Soc. Am.* **102**, doi:10.1785/0120120139.
- Schulte-Pelkum, V., P. S. Earle, and F. L. Vernon (2004). Strong directivity of ocean-generated seismic noise. **5**(3), doi:10.1029/2003GC000520.
- Schulte-Pelkum, V., G. Masters, and P. M. Shearer (2001). Upper mantle anisotropy from long-period P polarization. *J. Geophys. Res.* **154**, 21917–21934.
- Schuster, G. T. and J. Hu (2000). Green's function for migration: Continuous recording geometry. *Geophysics* **65**, 167–175.
- Schuster, G. T., J. Hu, J. Sheng, and J. Rickett (2004). Interferometric/daylight seismic imaging. *Geophys. J. Int.* **157**, 838–852.
- Scognamiglio, L., E. Tinti, and A. Michelini (2009). Real-time determination of seismic moment tensor for the Italian region. *Bull. Seis. Soc. Am.* **99**, 2223–2242.
- Scott, S. L., A. W. Blocker, F. V. Bonassi, H. A. Chipman, E. I. George, and R. E. McCulloch (2016). Bayes and Big Data: The consensus Monte Carlo algorithm. *Int. J. Manage. Sci. Eng. Manage.* **11**, 78–88.
- Seah, Y.-L., J. Shang, H. K. Ng, D. J. Nott, and B.-G. Englert (2015). Monte Carlo sampling from the quantum state space. II. *New J. Phys.* **17**, doi:10.1088/1367-2630/17/4/043018.
- Seats, K. J., J. F. Lawrence, and G. A. Prieto (2012). Improved ambient noise correlation functions using Welch's method. *Geophys. J. Int.* **188**, 513–523.
- Selby, N. D. and J. H. Woodhouse (2002). The Q structure of the upper mantle: Constraints from Rayleigh wave amplitudes. *J. Geophys. Res.* **107**, doi:10.1029/2001JB000257.
- Sen, M. K. and R. Biswas (2017). Tansdimensional seismic inversion using the reversible jump Hamiltonian Monte Carlo algorithm. *Geophysics* **82**, R119–R134.
- Sen, M. K. and P. L. Stoffa (2013). *Global optimization methods in geophysical inversion*. Cambridge, UK: Cambridge University Press.
- Sengör, A. M. C., S. Özeren, T. Genc, and E. Zor (2003). East Anatolian high plateau as a mantle-supported, north-south shortened domal structure. *Geophys. Res. Lett.* **24**, doi:10.1029/2003GL017858.
- Seriani, G. and E. Priolo (1994). Spectral element method for acoustic wave simulation in heterogeneous media. *Finite Elements in Analysis and Design* **16**, 337–348.
- Seriani, G. and C. Su (2012). Wave propagation in highly heterogeneous media by a poly-grid Chebyshev spectral element method. *J. Comp. Ac.* **20**, doi:10.1142/S0218396X12400048.
- Sethian, J. A. (1996). A fast marching level set method for monotonically advancing fronts. *Proc. Nat. Acad. Sci.* **93**(4), 1591–1595.
- Sethian, J. A. and A. M. Popovici (1999). 3-d travelttime computation using the fast marching method. *Geophysics* **64**(2), 516–523.
- Seydoux, L., J. de Rosny, and N. M. Shapiro (2017). Pre-processing ambient noise cross-correlations with equalizing the covariance eigenspectrum. *Geophys. J. Int.* **210**, 1432–1449.
- Shanno, D. F. (1970). Conditioning of quasi-Newton methods for function minimization. *Math. Comp.* **24**, 647–656.
- Shannon, C. E. (1948). A Mathematical Theory of Communication. *Bell Sys. Tech. J.* **27**, 379–423.
- Shao, G., X. Li, C. Ji, and T. Maeda (2011). Focal mechanism and slip history of the 2011 Mw 9.1 off the Pacific coast of Tohoku earthquake, constrained with teleseismic body and surface waves. *Earth planet. Space* **63**, 559–564.
- Shapiro, N. M. (2019). Applications with surface waves extracted from ambient seismic noise. In N. Nakata, L. Gualtieri,

- and A. Fichtner (Eds.), *Seismic Ambient Noise*, pp. 218–238. Cambridge University Press, Cambridge, U.K.
- Shapiro, N. M. and M. Campillo (2004). Emergence of broadband Rayleigh waves from correlations of the ambient seismic noise. *Geophys. Res. Lett.* **31**, doi:10.1029/2004GL019491.
- Shapiro, N. M., M. Campillo, L. Stehly, and M. Ritzwoller (2005). High resolution surface wave tomography from ambient seismic noise. *Science* **307**, 1615–1618.
- Shaw-Champion, M. E., N. J. White, S. M. Jones, and J. P. B. Lovell (2008). Quantifying transient mantle plume uplift in the Faroe-Shetland basin. *Tectonics* **27**, doi:10.1029/2007TC002106.
- Shearer, P., Y. Hedlin, and P. Earle (1998). PKP and PKKP precursor observations: implications for the small-scale structure of the deep mantle and core. In M. Gurnis, M. E. Wysession, E. Knittle, and B. A. Buffett (Eds.), *Core–Mantle Boundary Region*, Volume 28, pp. 37–56. Geodynamics Series, AGU, Washington, DC.
- Shen, L. and R. F. Siliciano (2008). Viral reservoirs, residual viremia, and the potential of highly active antiretroviral therapy to eradicate hiv infection. *Journal of Allergy and Clinical Immunology* **122**(1), 22–28.
- Shen, W., M. H. Ritzwoller, and V. Schulte-Pelkum (2013). Crustal and uppermost mantle structure in the central U.S. encompassing the Midcontinent Rift. *J. Geophys. Res.* **118**, 4325–4344.
- Shen, Y., Y. Ren, H. Gao, and B. Savage (2012). An improved method to extract very-broadband empirical Green’s functions from ambient seismic noise. *Bull. Seis. Soc. Am.* **102**, 1872–1877.
- Sheng, J., J. Liao, and T. Gerya (2016). Numerical modeling of deep oceanic slab dehydration: Implications for the possible origin of far field intra-continental volcanoes in northeastern china. *J. Asian Earth Sci.* **117**, 328–336.
- Sherman, J. and W. J. Morrison (1950). Adjustment of an inverse matrix corresponding to a change in one element of a given matrix. *Ann. Math. Stat.* **21**, 124–127.
- Shin, C. and Y. H. Cha (2008). Waveform inversion in the Laplace domain. *Geophys. J. Int.* **173**, 922–931.
- Shin, C. and D. J. Min (2006). Waveform inversion using a logarithmic wave field. *Geophysics* **71**, R31–R42.
- Shumway, R. and D. Stoffer (2010). *Time series analysis and its applications with R examples (3rd edition)*. Springer.
- Siebert, L. and T. Simkin (2002). *Volcanoes of the world: An illustrated catalog of Holocene volcanoes and their eruptions*. Smithsonian Institution, Global Volcanism Program Digital Information Series, <http://www.volcano.si.edu/world>.
- Siebert, L., T. Simkin, and P. Kimberley (2010). *Volcanoes of the World, 3rd edition*. University of California Press.
- Sieminski, A., Q. Liu, J. Trampert, and J. Tromp (2007a). Finite-frequency sensitivity of body waves to anisotropy based upon adjoint methods. *Geophys. J. Int.* **171**, 368–389.
- Sieminski, A., Q. Liu, J. Trampert, and J. Tromp (2007b). Finite-frequency sensitivity of surface waves to anisotropy based upon adjoint methods. *Geophys. J. Int.* **168**, 1153–1174.
- Sieminski, A., J. Trampert, and J. Tromp (2009). Principal component analysis of anisotropic finite-frequency kernels. *Geophys. J. Int.* **179**, 1186–1198.
- Sigloch, K., N. McQuarrie, and G. Nolet (2008). Two-stage subduction history under north america inferred from multiple-frequency tomography. *Nat. Geosc.* **1**, doi:10.1038/ngeo231.
- Silveira, G., E. Stutzmann, D. Griot, J. P. Montagner, and L. Mendes-Victor (1998). Anisotropic tomography of the atlantic ocean from rayleigh surface waves. *Phys. Earth Planet. Inter.* **106/3–4**, 259–275.
- Silver, P. and W. W. Chan (1988). Implications for continental structure and evolution from seismic anisotropy. *Nature* **335**, 34–39.
- Silwal, V. and C. Tape (2016). Seismic moment tensors and estimated uncertainties in southern Alaska. *J. Geophys. Res.* **121**, 2772–2797.
- Simmons, N. A., A. M. Forte, L. Boschi, and S. P. Grand (2010). GyPSuM: A joint tomography model of mantle density and seismic wave speeds. *J. Geophys. Res.* **115**, doi:10.1029/2010JB007631.
- Simmons, N. A., S. C. Myers, G. Johannesson, and E. Matzel (2012). LLNL-G3Dv3: Global P wave tomography model for improved regional and teleseismic travel time prediction. *J. Geophys. Res.* **117**(B10).
- Simo, J. C., N. Tarnow, and K. K. Wong (1992). Exactly energy-momentum conserving algorithms and symplectic schemes for nonlinear dynamics. *Comp. Meth. Appl. Mech. Eng.* **100**, 63–116.
- Simon, V., D. D. Ho, and Q. A. Karim (2006). Hiv/aids epidemiology, pathogenesis, prevention, and treatment. *The Lancet* **368**(9534), 489–504.
- Simons, F. J., R. D. van der Hilst, and M. T. Zuber (2003). Seismic and mechanical anisotropy and the past and present deformation of the Australian lithosphere. *Earth Planet. Sci. Lett.* **211**, 271–286.
- Simute, S., H. Steptoe, A. Gokhberg, and A. Fichtner (2016). Full-waveform inversion of the Japanese islands region. *J. Geophys. Res.* **121**, 3722–3741.
- Singh, S. C., M. A. J. Taylor, and J. P. Montagner (2000). On the presence of liquid in Earth’s inner core. *Science* **287**, 2471–2474.
- Sipkin, S. and T. H. Jordan (1979). Frequency-dependence of QScS. *Bull. Seis. Soc. Am.* **69**, 1055–1079.
- Sirgue, L., O. I. Barkved, J. Dellinger, J. Etgen, U. Albertin, and J. H. Kommedal (2010). Full-waveform inversion: the next leap forward in imaging at Valhall. *First Break* **28**, 65–70.
- Sirgue, L. and R. G. Pratt (2004a). Efficient waveform inversion and imaging: A strategy for selecting temporal frequencies. *Geophysics* **69**, 231–248.
- Sirgue, L. and R. G. Pratt (2004b). Efficient waveform inversion and imaging: A strategy for selecting temporal frequencies. *Geophysics* **69**, 231–248.
- Sleep, N. and N. Töksöz (1971). Evolution of marginal basins. *Nature* **233**, 548–550.
- Sleijpen, G. L. G. and H. van der Vorst (2000). A Jacobi–Davidson Iteration Method for Linear Eigenvalue Problems. *SIAM Review* **42**, 267–293.
- Slepian, D. (1978). Prolate spheroidal wave functions, Fourier analysis, and uncertainty - V. The discrete case. *The Bell System Technical Journal* **57**, 1371–1431.
- Small, P., D. Gill, P. J. Maechling, R. Taborda, S. Callaghan, T. H. Jordan, K. B. Olsen, G. P. Ely, and C. Goulet (2017). The SCEC unified community velocity model software framework. *Seis. Res. Lett.* **88**, doi:10.1785/0220170082.

- Smithyman, B., R. G. Pratt, J. Hayles, and R. Wittebolle (2009). Detecting near-surface objects with seismic waveform tomography. *Geophysics* **74**, WCC119–WCC127.
- Snieder, R. (1986a). 3D Linearized scattering of surface waves and formalism for surface wave holography. *Geophys. J. R. Astron. Soc.* **84**, 581–605.
- Snieder, R. (1986b). The influence of topography on the propagation and scattering of surface waves. *Phys. Earth Planet. Inter.* **44**, 226–241.
- Snieder, R. (1988). Large scale inversion of surface waves for lateral heterogeneity: 2. Application to surface waves in Europe and the Mediterranean. *J. Geophys. Res.* **93**, 12067–12080.
- Snieder, R. (2004). Extracting the Green's function from the correlation of coda waves: A derivation based on stationary phase. *Phys. Rev. E* **69**, doi:10.1103/PhysRevE.69.046610.
- Snieder, R. and E. Şafak (2006). Extracting the building response using seismic interferometry: Theory and application to the Millikan Library in Pasadena, California. *Bull. Seis. Soc. Am.* **96**, 586–598.
- Snieder, R., Y. Fan, E. Slob, and K. Wapenaar (2010). Equipartitioning is not sufficient for Green's function extraction. *Earthq. Sci.* **23**, 403–415.
- Snieder, R., M. Miyazawa, E. Slob, I. Vasconcelos, and K. Wapenaar (2009). A comparison of strategies for seismic interferometry. *Surv. Geophys.* **30**, 503–523.
- Snieder, R. and G. Nolet (1987). Linearized scattering waves on a spherical Earth. *J. Geophys.* **61**, 55–63.
- Snieder, R. and B. Romanowicz (1988). A new formalism for the effect of lateral heterogeneity on normal modes and surface waves: I. Isotropic perturbations, perturbations of interfaces and gravitational perturbations. *Geophys. J. Int.* **92**, 207–222.
- Snieder, R. and J. Trampert (1999). Inverse problems in geophysics. In A. Wirgin (Ed.), *Wavefield Inversion*, pp. 119–190.
- Snieder, R., K. Wapenaar, and K. Larner (2006). Spurious multiples in seismic interferometry of primaries. *Geophysics* **71**, SI111–SI124.
- Soldati, G., L. Boschi, and A. Piersanti (2006). Global seismic tomography and modern parallel computers. *Ann. Geophys.* **49**, 977–986.
- Song, X. and P. Richards (1996). Seismological evidence for differential rotation of the Earth's inner core. *Nature* **382**, 221–224.
- Song, X. D. and D. Helmberger (1993). Anisotropy of the Earth's inner core. *Geophys. Res. Lett.* **20**, 285–288.
- Souriau, A. and B. Romanowicz (1997). Anisotropy in the inner core; relation between P-velocity and attenuation. *Phys. Earth Planet. Inter.* **101**, 33–47.
- Souriau, A., P. Roudil, and B. Moynot (1997). Inner core differential rotation: Facts and artefacts. *Geophys. Res. Lett.* **24**, 2103–2106.
- Spakman, W. (1991). Delay-time tomography of the upper mantle below Europe, the Mediterranean and Asia Minor. *Geophys. J. Int.* **107**, 309–332.
- Spakman, W., S. van der Lee, and R. van der Hilst (1993). Travel-time tomography of the European-Mediterranean mantle down to 1400 km. *Phys. Earth Planet. Inter.* **79**, 3–74.
- Spica, Z. J., M. Perton, E. R. Martin, B. C. Beroza, and B. Biondi (2020). Urban seismic site characterization by fiber-optic seismology. *J. Geophys. Res.* **125**, doi:10.1029/2019JB018656.
- Spotz, W. and G. Carey (2000). Extension of high order compact schemes to time dependent problems. *Numer. Meth. Part. Diff. Eq.* in pressxxx.
- Spotz, W., M. Taylor, and P. Swarztrauber (1998). Fast shallow-water equation solvers in latitude-longitude coordinates. *J. Comp. Phys.* **145**, 432–444.
- Spotz, W., M. Taylor, and P. Swarztrauber (2000, May). Fast and high-order solutions to the spherical shallow-water equations. In *Applied Numerical Mathematics, Proceedings of the Fourth International Conference on Spectral and High-Order Methods*, Volume 33, pp. 191–197.
- Stacey, F. D. and D. E. Loper (1983). The thermal boundary layer interpretation of D" and its role to plume sources. *Phys. Earth Planet. Inter.* **33**, 45–55.
- Stahler, S. C. and K. Sigloch (2014). Fully probabilistic seismic source inversion - Part I: Efficient parameterisation. *Solid Earth* **5**, doi:10.5194/se-5-1055-2014.
- Stahler, S. C. and K. Sigloch (2017). Fully probabilistic seismic source inversion - Part II: Modelling errors and station covariances. *Solid Earth* **7**, doi:10.5194/se-7-1521-2016.
- Stange, S. and W. Friederich (1992). Guided wave propagation across sharp lateral heterogeneities: the complete wavefield at a cylindrical inclusion. *Geophys. J. Int.* **111**, 470–482.
- Starius, G. (1977). Composite mesh difference methods for elliptic boundary value problems. *Numer. Math.* **28**, 243–258.
- Starius, G. (1980). On composite mesh difference methods for hyperbolic differential equations. *Numer. Math.* **35**, 241–255.
- Stead, R. J. and D. V. Helmberger (1988). Numerical-analytical interfacing in two dimensions with applications to modeling NST seismograms. *Pure Appl. Geophys.* **174**, 153–174.
- Stefan, J. (1891). Über die Theorie der Eisbildung, insbesondere über die Eisbildung im Polarmeere. *Annalen der Physik und Chemie* **42**, 269–286.
- Stehly, L., M. Campillo, B. Froment, and R. L. Weaver (2008). Reconstructing Green's function by correlation of the coda of the correlation (C3) of ambient seismic noise. *J. Geophys. Res.* **113**, doi:10.1029/2008JB005693.
- Stehly, L., M. Campillo, and N. M. Shapiro (2006). A study of the seismic noise from its long-range correlation properties. *J. Geophys. Res.* **111**, doi:10.1029/2005JB004237.
- Stehly, L., M. Campillo, and N. M. Shapiro (2007). Traveltime measurements from noise correlation: stability and detection of instrumental time-shifts. *Geophys. J. Int.* **171**, 223–230.
- Stehly, L. and P. Cupillard (2016). Modulating the distribution of noise sources that contribute to seismic-noise correlations. *Geophys. J. Int.* **xxx**, in progress.
- Stehly, L., P. Cupillard, and B. Romanowicz (2011). Towards improving ambient noise tomography using simultaneously curvelet denoising filters and SEM simulations of seismic ambient noise. *Com. Rend. Geosc.* **343**, 591–599.
- Stehly, L., B. Fry, M. Campillo, N. M. Shapiro, J. Guilbert, L. Boschi, and D. Giardini (2009). Tomography of the Alpine region from observations of seismic ambient noise. *Geophys. J. Int.* **178**, 338–350.
- Stein, R. S., A. A. Barka, and J. H. Dieterich (1997). Progressive failure on the North Anatolian Fault since 1939 by earthquake stress triggering. *Geophys. J. Int.* **128**, 594–604.

- Stephani, H. and G. Kluge (1995). *Theoretische Mechanik*. Spektrum Akademischer Verlag, Heidelberg.
- Stich, D., P. Danecek, A. Morelli, and J. Tromp (2009). Imaging lateral heterogeneity in the northern Apennines from time reversal of reflected surface waves. *Geophys. J. Int.* **177**, 543–554.
- Stixrude, L. and C. Lithgow-Bertelloni (2005). Thermodynamics of mantle minerals — I. Physical properties. *Geophys. J. Int.* **162**:2, 610–632.
- Stixrude, L. and C. Lithgow-Bertelloni (2011). Thermodynamics of mantle minerals – II. Phase equilibria. *Geophys. J. Int.* **184**, 1180–1213.
- Struve, O. (1952). Proposal for a project of high-precision stellar radial velocity work. *The Observatory* **72**, 199–200.
- Stutzmann, E., F. Ardhuin, M. Schimmel, A. Mangeney, and G. Patau (2012). Modelling long-term seismic noise in various environments. *Geophys. J. Int.* **191**, 707–722.
- Stutzmann, E., Y. Capdeville, and J. P. Montagner (1997). Study of Hawai Hotspot Structure Using Seismic Surface Waves. In *IASPEI 1997, Thessaloniki, Greece, Abstracts*, pp. 241.
- Stutzmann, E., L. Vinnik, A. Ferreira, and S. Singh (2000). Constraint on the s-wave velocity at the base of the mantle. *Geophys. Res. Lett.* **27**(11), 1571.
- Styblinski, M. A. and T.-S. Tang (1990). Experiments in nonconvex optimization: Stochastic approximation with function smoothing and simulated annealing. *Neural Networks* **3**, 467–483.
- Su, L., J. Park, and Y. Yu (1993). Born seismograms using coupled free oscillations: the effect of strong coupling and anisotropy. *Geophys. J. Int.* **115**, 849–862.
- Su, W., R. Woodward, and A. Dziewoński (1994a). Degree 12 model of shear velocity heterogeneity in the mantle. *J. Geophys. Res.* **99**, 6945–6980.
- Su, W.-J., R. L. Woodward, and A. M. Dziewoński (1994b). Degree-12 model of shear velocity heterogeneity in the mantle. *J. Geophys. Res.* **99**, 6945–6980.
- Sun, W. S. and B. L. N. Kennett (2016). Receiver structure from teleseisms: Autocorrelation and cross correlation. *Geophys. Res. Lett.* **43**, 6234–6242.
- Swarztrauber, P. (1996). Spectral transform methods for solving the shallow water equations on the sphere. *Mon. Wea. Rev.* **124**, 730–744.
- Swarztrauber, P. N. (1993). The vector harmonic transform method for solving partial differential equations in spherical geometry. *Mon. Wea. Rev.* **121**, 3415–3437.
- Symes, W. W. (1980). Numerical stability in an inverse scattering problem. *SIAM J. Num. Analysis* **17**, 707–732.
- Symes, W. W. (2008). Migration velocity analysis and waveform inversion. *Geophys. Prosp.* **56**, 765–790.
- Symon, K. R. (1971). *Mechanics*. Addison-Wesley, Reading, Massachusetts.
- Szu, H. and R. Hartley (1987). Fast simulated annealing. *Phys. Lett. A* **122**, 157–162.
- Taillandier, C., M. Noble, H. Chauris, and H. Calandra (2009). First arrival travel time tomography based on the adjoint state methods. *Geophysics* **74**(6), WCB57–WCB66.
- Taira, A. (2001). Tectonic evolution of the Japanese island arc system. *Ann. Rev. Earth Planet. Sci.* **29**, 109–134.
- Takam Takougang, E. M. and A. Calvert (2011). Application of waveform tomography to marine seismic reflection data from the queen charlotte basin of western canada. *Geophysics* **76**, B55–B70.
- Takeuchi, C. S. and Y. Fialko (2012). Dynamic models of interseismic deformation and stress transfer from plate motion to continental transform faults. *J. Geophys. Res.* **117**, doi:10.1029/2011JB009056.
- Takeuchi, H. and M. Saito (1972a). Seismic surface waves. in: *Methods in Computational Physics*, editor B. A. Bolt **11**, 217–295.
- Takeuchi, H. and M. Saito (1972b). Seismic surface waves. *Methods in computational Physics*. **11**, 217–295.
- Takeuchi, N. and R. Geller (2000). Optimally accurate second order time-domain finite difference scheme for computing synthetic seismograms in 2-D and 3-D media. *Phys. Earth Planet. Int.* **119**, 99–131.
- Takeuchi, N., R. Geller, and P. Cummins (1996). Highly accurate P-SV complete synthetic seismograms using modified DSM operators. *Geophys. Res. Lett.* **23**, 1175–1178.
- Takeuchi, N., R. Geller, and P. R. Cummins (2000). Complete synthetic seismograms for 3-D heterogeneous Earth models computed using modified DSM operators and their applicability to inversion for Earth structure. *Phys. Earth Planet. Inter.* **119**, 25–36.
- Tang, Y., M. Obayashi, F. Niu, S. Grand, Y. Chen, H. Kawakatsu, S. Tanaka, J. Ning, and J. Ni (2014). Changbaishan volcanism in northeast China linked to subduction-induced mantle upwelling. *Nature Geoscience* **7**, 470–475.
- Tanimoto, T. (1984a). A simple derivation of the formula to calculate synthetic long period seismograms in heterogeneous earth by normal mode summation. *Geophys. J. R. Astron. Soc.* **77**, 275–278.
- Tanimoto, T. (1984b). Waveform inversion of mantle love waves: the Born seismogram approach. *Geophys. J. R. Astron. Soc.* **78**, 641–660.
- Tanimoto, T. (1986). Free oscillations of a slightly anisotropic earth. *Geophys. J. R. Astron. Soc.* **87**, 493–517.
- Tanimoto, T. (1991). Waveform inversion for three-dimensional density and S wave structure. *J. Geophys. Res.* **96**, 8167–8189.
- Tao, G. and M. S. King (1990). Shear-wave velocity and Q anisotropy in rocks: A laboratory study. *Int. J. Rock Mech. Min. Sci. Geomech. Abstr.* **27**, 353–361.
- Tape, C., Q. Liu, A. Maggi, and J. Tromp (2009). Adjoint tomography of the southern California crust. *Science* **325**, 988–992.
- Tape, C., Q. Liu, A. Maggi, and J. Tromp (2010). Seismic tomography of the southern California crust based upon spectral-element and adjoint methods. *Geophys. J. Int.* **180**, 433–462.
- Tape, C., Q. Liu, and J. Tromp (2007). Finite-frequency tomography using adjoint methods - Methodology and examples using membrane surface waves. *Geophys. J. Int.* **168**, 1105–1129.
- Tape, W. and C. Tape (2012). A geometric setting for moment tensors. *Geophys. J. Int.* **190**, 476–498.
- Tape, W. and C. Tape (2015). A uniform parametrization of moment tensors. *Geophys. J. Int.* **202**, 2074–2081.
- Tarantola, A. (1984). Inversion of seismic reflection data in the acoustic approximation. *Geophysics* **49**, 1259–1266.
- Tarantola, A. (1986). A strategy for nonlinear elastic inversion of seismic reflection data. *Geophysics* **51**, 1893–1903.

- Tarantola, A. (1988). Theoretical background for the inversion of seismic waveforms, including elasticity and attenuation. *Pure Appl. Geophys.* **128**, 365–399.
- Tarantola, A. (2005). *Inverse problem theory and methods for model parameter estimation, 2nd edition*. Society for Industrial and Applied Mathematics, Philadelphia.
- Tarantola, A. and B. Valette (1982a). Generalized nonlinear inverse problems solved using the least squares criterion. *Rev. Geophys.* **20**, 219–232.
- Tarantola, A. and B. Valette (1982b). Inverse problems = Quest for information. *Geophysics* **50**, 159–170.
- Tatsumi, Y. (1989). Migration of fluid phases and genesis of basalt magmas in subduction zones. *J. Geophys. Res.* **94**:B4, 4697–4707.
- Tatsumi, Y., S. Maruyama, and S. Nohda (1990). Mechanism of backarc opening in the Japan Sea: role of asthenospheric injection. *Tectonophysics* **181**, 299–306.
- Taylor, M., J. Tribbia, and M. Iskandarani (1997). The spectral element method for the shallow water equations on the sphere. *J. Comp. Phys.* **130**, 92–108.
- Tessmer, E. (2000). Seismic finite-difference modelling with spatially varying time steps. *Geophysics* **65**, 1290–1293.
- Tessmer, E., D. Kosloff, and A. Behle (1992). Elastic wave propagation simulation in presence of surface topography. *Geophys. J. Int.* **108**, 621–632.
- Thomas, C., H. Igel, M. Weber, and F. Scherbaum (2000). Simulation of P-wave propagation in a heterogeneous spherical Earth: The influence of scatterers on the PKP wavefield. *Geophys. J. Int.* **141**, 307–320.
- Thompson, A. (1992). Water in the Earth's upper mantle. *Nature* **358**, 295–302.
- Thomson, D. J. (1982). Spectrum estimation and harmonic analysis. *Proceedings of the IEEE* **70**, 1055–1096.
- Thomson, W. T. (1950). Transmission of elastic waves through a stratified solid medium. *J. Appl. Phys.* **21**, 89–93.
- Thordarson, T. and S. Self (2003). Atmospheric and environmental effects of the 1783–1784 Laki eruption: A review and reassessment. *J. Geophys. Res.* **108**, doi:10.1029/2001JD002042.
- Thrustarson, S., R. Torfason, S. Klaasen, P. Paitz, Y. Çubuk-Sabuncu, K. Jónsdóttir, and A. Fichtner (2021). Detecting seismic events with computer vision: Applications for fiber-optic sensing. *Earth and Space Science Open Archive*.
- Thrustarson, S., M. van Driel, L. Krischer, C. Boehm, M. Afanasiev, D.-P. van Herwaarden, and A. Fichtner (2020). Accelerating numerical wave propagation by wavefield adapted meshes, part ii: Full-waveform inversion. *Geophys. J. Int.* **221**, 1591–1604.
- Thurin, J., R. Brossier, and L. Métivier (2019). Ensemble-based uncertainty estimation in full-waveform inversion. *Geophys. J. Int.* **219**, 1613–1635.
- Thybo, H. and E. Perchuc (1997). The seismic 8° discontinuity and partial melting in the continental mantle. *Science* **275**, 1626–1629.
- Tian, Y. and M. H. Ritzwoller (2015). Directionality of ambient noise on the Juan de Fuca plate: implications for source locations of the primary and secondary microseisms. *Geophys. J. Int.* **201**(1), 429–443.
- Tian, Y., K. Sigloch, and G. Nolet (2009). Multiple-frequency SH-wave tomography for the western US upper mantle. *Geophys. J. Int.* **178**, 1384–1402.
- Tkalčić, H., A. J. Rodgers, N. Rawlinson, D. J. McEwan, and C. M. Snelson (2008). Teleseismic travel-time delays in the Las Vegas Basin. *Bull. Seis. Soc. Am.* **98**(4), 2047–2060.
- Tondi, R., U. Achauer, M. Landes, R. Davi, and L. Besutiu (2009). Unveiling seismic and density structure beneath the Vrancea seismogenic zone, Romania. *J. Geophys. Res.* **141**, doi:10.1029/2008JB005992.
- Tondi, R., R. de Franco, and R. Barzaghi (2000). Sequential inversion of refraction and wide-angle reflection traveltimes and gravity data for two-dimensional velocity structures. *Geophys. J. Int.* **141**, 679–698.
- Tone, S., T. Miyatake, K. Hikima, and A. Kato (2009). Change of static stress fields from earthquake rupture in heterogeneous crustal structure. *J. Seis. Soc. Japan* **62**, 97–107.
- Tong, J., F. A. Dahlen, G. Nolet, and H. Marquering (1998). Diffraction effects upon finite-frequency travel times: A simple 2-D example. *Geophys. Res. Lett.* **25**, 1983–1986.
- Tong, P., D. Yang, D. Li, and Q. Liu (2017). Time-evolving seismic tomography: The method and its application to the 1989 Loma Prieta and 2014 South Napa earthquake area, California. *Geophys. Res. Lett.* **44**, 3165–3175.
- Tork Qashqai, M., E. Saygin, and B. L. N. Kennett (2019). Crustal imaging with Bayesian inversion of teleseismic P wave coda autocorrelation. *J. Geophys. Res.* **124**, 5888–5906.
- Toxvaerd, S. (1994). Hamiltonians for discrete systems. *Phys. Rev. E* **50**, 2271–2274.
- Toxvaerd, S., O. J. Heilmann, and J. C. Dyre (2012). Energy conservation in molecular dynamics simulations of classical systems. *J. Chem. Phys.* **136**, doi:10.1063/1.4726728.
- Traer, J. and P. Gerstoft (2014). A unified theory of microseisms and hum. *J. Geophys. Res.* **119**(4), 3317–3339.
- Trampert, J., F. Deschamps, J. Resovsky, and D. Yuen (2004). Probabilistic tomography maps chemical heterogeneities throughout the lower mantle. *Science* **306**, 853–856.
- Trampert, J. and A. Fichtner (2013). Resolution tests revisited: The power of random numbers. *Geophys. J. Int.* **192**, 676–680.
- Trampert, J., A. Fichtner, and J. Ritsema (2013). Global imaging of the Earth's deep interior: seismic constraints on (an)isotropy, density and attenuation. In S. Karato (Ed.), *Physics and Chemistry of the deep Earth*. Wiley-Blackwell.
- Trampert, J. and H. J. van Heijst (2002). Global azimuthal anisotropy in the transition zone. *Science* **296**, 1297–1299.
- Trampert, J. and J. H. Woodhouse (1995). Global phase velocity maps of Love and Rayleigh waves between 40 and 150 seconds. *Geophys. J. Int.* **122**, 675–690.
- Trampert, J. and J. H. Woodhouse (2003). Global anisotropic phase velocity maps for fundamental mode surface waves between 40 and 150 s. *Geophys. J. Int.* **154**, 154–165.
- Tromp, J. and E. Bachmann (2019). Source encoding for adjoint tomography. *Geophys. J. Int.* **218**, 2019–2044.
- Tromp, J. and F. Dahlen (1990). Free oscillations of a spherical anelastic Earth. *Geophys. J. Int.* **103**, 707–723.
- Tromp, J. and F. Dahlen (1992). Variational principles for surface wave propagation on a laterally heterogeneous Earth: 2. Frequency domain JWKB theory. *Geophys. J. Int.* **109**, 599–619.
- Tromp, J. and F. Dahlen (1993). Maslov theory for surface wave propagation on a laterally heterogeneous Earth. *Geophys. J. Int.* **115**, 512–528.

- Tromp, J., Y. Luo, S. Hanasoge, and D. Peter (2010). Noise cross-correlation sensitivity kernels. *Geophys. J. Int.* **183**, 791–819.
- Tromp, J., C. Tape, and Q. Liu (2005). Seismic tomography, adjoint methods, time reversal and banana-doughnut kernels. *Geophys. J. Int.* **160**, 195–216.
- Trujillo, I., J. A. L. Aguerri, and C. M. Gutierrez (2001). The effects of seeing on Sérsic profiles. *Mon. Not. R. Astron. Soc.* **321**, 269–276.
- Tsai, V. C. (2009). On establishing the accuracy of noise tomography traveltimes measurements in a realistic medium. *Geophys. J. Int.* **178**, 1555–1564.
- Tsai, V. C. (2010). The relationship between noise correlation and the green's function in the presence of degeneracy and the absence of equipartition. *Geophys. J. Int.* **182**, 1509–1514.
- Tsai, V. C. (2011). Understanding the amplitudes of noise correlation measurements. *J. Geophys. Res.* **116**, doi:10.1029/2011JB008483.
- Turcotte, D. L. and G. Schubert (2014). *Geodynamics*. Cambridge University Press.
- Turin, G. L. (1960). An introduction to matched filters. *IRE Trans. Inf. Theo.* **6**, 311–329.
- Turner, F. J. (1942). Preferred orientation of olivine crystals in peridotites, with special reference to New Zealand examples. *Trans. Roy. Soc. New Zealand* **72**, 280–300.
- Um, J., F. Dahlen, and J. Park (1991). Normal mode multiplet coupling along a dispersion branch. *Geophys. J. Int.* **106**, 381–401.
- Unwin, S. D. (2004). *The probability of God*. Crown Publishing Group.
- Vackár, J., J. Burjének, F. Gallovič, J. Zahradník, and J. Clinton (2017). Bayesian ISOLA: new tool for automated centroid moment tensor inversion. *Geophys. J. Int.* **210**, 693–705.
- Vai, R., J. Castillo-Covarrubias, F. Sánchez-Sesma, D. Komatitsch, and J.-P. Vilotte (1999). Elastic wave propagation in an irregularly layered medium. *Soil Dyn. Earthquake Engrg.* **18**, 11–18.
- Valentine, A. P. and J. Trampert (2012). Assessing the uncertainties on seismic source parameters: Towards realistic error estimates for centroid moment-tensor determinations. *Phys. Earth Planet. Int.* **210–211**, 36–49.
- Valentine, A. P. and J. Trampert (2016). The impact of approximations and arbitrary choices on geophysical images. *Geophys. J. Int.* **204**, 59–73.
- Valentine, A. P. and J. H. Woodhouse (2010a). Approaches to automated data selection for global seismic tomography. *Geophys. J. Int.* **182**, 1001–1012.
- Valentine, A. P. and J. H. Woodhouse (2010b). Reducing errors in seismic tomography: Combined inversion for sources and structure. *Geophys. J. Int.* **180**, 847–857.
- Valette, B. (1986a). About the influence of pre-stress upon adiabatic perturbation of the Earth. *Geophys. J. R. Astr. Soc.* **85**, 179–208.
- Valette, B. (1986b). About the influence of pre-stress upon the adiabatic perturbations of the earth. *Geophys. J. Roy. Astron. Soc.* **85**, 179–208.
- Valette, B. (1987). *Spectre des oscillations libres de la Terre : aspects mathématiques et géophysiques*. Thèse de Doctorat d'état, Université Paris VII.
- Valette, B. (1989a). étude d'une classe de problème spectraux. *C.R. Acad. Sci.* **309**, 785–788. Série I.
- Valette, B. (1989b). Spectre de vibrations propres d'un corps élastique, autogravitant, en rotation uniforme et contenant une partie fluide. *C.R. Acad. Sci.* **309**, 419–422. Série I.
- Vallée, M. (2013). Source time function properties indicate a strain drop independent of earthquake depth and magnitude. *Nat. Comm.* **4**, doi: 10.1038/ncomms3606.
- van Dalen, K. N., K. Wapenaar, and D. F. Halliday (2014). Surface wave retrieval in layered media using seismic interferometry by multidimensional deconvolution. *Geophys. J. Int.* **196**, 230–242.
- van der Hilst, R., S. Widiyantoro, K. Creager, and T. McSweeney (1998). Deep subduction and aspherical variations in P-wavespeed at the base of the Earth's mantle. In G. et al. (Ed.), *Core-Mantle boundary region*, Volume 28 of *Geodyn. Ser.*, pp. 5–20. Washington D.C.: AGU.
- Van Der Hilst, R., S. Widiyantoro, and E. Engdahl (1997). Evidence for deep mantle circulation from global tomography. *Nature* **386**, 578–584.
- van der Hilst, R., S. Widiyantoro, and E. Engdahl (1997). Evidence for deep mantle circulation from global tomography. *Nature* **386**, 578–584.
- van der Neut, J., J. Thorbecke, K. Mehta, E. Slob, and K. Wapenaar (2011). Controlled-source interferometric redatuming by crosscorrelation and multidimensional deconvolution in elastic media. *Geophysics* **76**, SA63–SA76.
- van Driel, M., C. Boehm, L. Krischer, and M. Afanasiev (2020). Accelerating numerical wave-propagation using wavefield adapted meshes, Part I: Forward and adjoint modelling. *Geophys. J. Int.* **211**, 1580–1590.
- van Driel, M., L. Krischer, S. C. Stähler, K. Hosseini, and T. Nissen-Meyer (2015). Instaseis: instant global seismograms based on a broadband waveform database. *Solid Earth* **6**, doi:10.5194/se-6-701-2015.
- van Driel, M. and T. Nissen-Meyer (2014a). Optimized visco-elastic wave propagation for weakly dissipative media. *Geophys. J. Int.* **199**, 1078–1093.
- van Driel, M. and T. Nissen-Meyer (2014b). Seismic wave propagation in fully anisotropic axisymmetric media. *Geophys. J. Int.* **199**, 880–893.
- van Herwaarden, D.-P., M. Afanasiev, C. Boehm, M. van Driel, L. Krischer, S. Thrastarson, J. Trampert, and A. Fichtner (2018). Evolutionary full-waveform inversion. In *AGU 2018 Conference Abstracts*. American Geophysical Union.
- van Herwaarden, D.-P., C. Boehm, M. Afanasiev, S. Thrastarson, L. Krischer, M. van Driel, and A. Fichtner (2019). Evolutionary full-waveform inversion. *J. Geophys. Res.*, in prep.
- van Herwaarden, D.-P., C. Boehm, M. Afanasiev, S. Thrastarson, L. Krischer, M. van Driel, and A. Fichtner (2020). Accelerated full-waveform inversion using dynamic mini-batches. *Geophys. J. Int.* **221**, 1427–1438.
- van Hinsbergen, D. J. J., N. Kaymakci, W. Spakman, and T. H. Torsvik (2010). Reconciling the geological history of western turkey with plate circuits and mantle tomography. *Earth Planet. Sci. Lett.* **297**, 674–686.
- van Leeuwen, T. and F. J. Herrmann (2013). Mitigating local minima in full-waveform inversion by expanding the search space. *Geophys. J. Int.* **195**, 661–667.

- van Leeuwen, T. and W. A. Mulder (2010). A correlation-based misfit criterion for wave-equation travelttime tomography. *Geophys. J. Int.* **182**, 1383–1394.
- van Vleck, J. H. and D. Middleton (1966). The spectrum of clipped noise. *Proc. IEEE* **54**, 2–19.
- Vanacore, E., T. Taymaz, and E. Saygin (2013). Moho structure of the Anatolian plate from receiver function analysis. *Geophys. J. Int.*, in press.
- Vasco, D. and L. Johnson (1998). Whole earth structure estimated from seismic arrival times. *J. Geophys. Res.* **103**, 2633–2671.
- Vasconcelos, I. and R. Snieder (2008a). Interferometry by deconvolution, Part 1 – Theory for acoustic waves and numerical examples. *Geophysics* **73**, S129–S141.
- Vasconcelos, I. and R. Snieder (2008b). Interferometry by deconvolution, Part 2 – Theory for elastic waves and application to drill-bit seismic imaging. *Geophysics* **73**, S115–S128.
- Vasconcelos, I., R. Snieder, and H. Douma (2009). Representation theorems and Green's function retrieval for scattering in acoustic media. *Phys. Rev. E* **80**, 036605.
- Vaseghi, S. V. (2007). *Multimedia signal processing: Theory and applications in speech, music and communications*. John Wiley & Sons, Ltd.
- Verbeke, J., L. Boschi, L. Stehly, E. Kissling, and A. Michelini (2012). High-resolution Rayleigh-wave velocity maps of central Europe from a dense ambient-noise data set. *Geophys. J. Int.* **188**, 1173–1187.
- Verlet, L. (1967). Computer experiments on classical fluids. I. Thermodynamical properties of Lennard-Jones Molecules. *Phys. Rev.* **159**, 98–103.
- Verma, R. K. (1960). Elasticity of some high-density crystals. *J. Geophys. Res.* **65**, 757–766.
- Vidale, J. and M. Hedlin (1998). Evidence for partial melt at the core-mantle boundary north of tonga from the strong scattering of seismic waves. *Nature* **391**, 682–685.
- Vidale, J. E., D. A. Dodge, and P. S. Earle (2000). Slow differential rotation of the earth's inner core indicated by temporal changes in scattering. *Nature* **405**, 445–448.
- Viens, L. and M. A. Denolle (2019). Long-period ground motions from past and virtual megathrust earthquakes along the Nankai Trough, Japan. *Bull. Seis. Soc. Am.* **109**, 1312–1330.
- Viens, L., M. A. Denolle, H. Miyake, S. Sakai, and S. Nakagawa (2017). Retrieving impulse response function amplitudes from the ambient seismic field. *Geophys. J. Int.* **210**, 210–222.
- Vinnik, L., L. Bréger, and B. Romanowicz (1998). Anisotropic structures at the base of the Earth's mantle. *Nature* **393**, 564–567.
- Vinnik, L., S. Chevrot, and J. P. Montagner (1997). Evidence for a stagnant plume in the transition zone? *Geophys. Res. Lett.* **24**, 1007–1010.
- Vinnik, L., B. Romanowicz, Y. L. Stunff, and L. Makeyeva (1996). Seismic anisotropy in the D" layer. *Geophys. Res. Lett.* **22**, 1657–1660.
- Vinnik, L. P., V. Farra, and B. Romanowicz (1989). Observational evidence for diffracted SV in the shadow of the Earth's core. *Geophys. Res. Lett.* **16**(6), 519–522.
- Vinnik, L. P., B. Romanowicz, Y. L. Stunff, and L. Makeyeva (1995). Seismic anisotropy in the D" layer. *Geophys. Res. Lett.* **22**(13), 1657–1660.
- Virieux, J. (1984). SH wave propagation in heterogeneous media: velocity-stress finite difference method. *Geophysics* **49**, 1933–1942.
- Virieux, J. (1986). P-SV wave propagation in heterogeneous media: velocity-stress finite difference method. *Geophysics* **51**, 889–901.
- Virieux, J. and S. Operto (2009). An overview of full waveform inversion in exploration geophysics. *Geophysics* **74**, WCC127–WCC152.
- Visser, G., P. Guo, and E. Saygin (2019). Bayesian transdimensional seismic full-waveform inversion with a dipping layer parameterization. *Geophysics* **84**, R845–R858.
- Visser, K., J. Trampert, and B. L. N. Kennett (2008). Global anisotropic phase velocity maps for higher-mode Love and Rayleigh waves. *Geophys. J. Int.* **172**, 1016–1032.
- Wakita, K. (2013). Geology and tectonics of Japanese islands: A review - The key to understanding the geology of Asia. *J. Asian Earth Sci.* **72**, 75–87.
- Waldrop, M. M. (2016). More than Moore. *Nature* **530**, 144–147.
- Walter, F., D. Gräff, F. Lindner, P. Paitz, M. Köpfl, M. Chmiel, and A. Fichtner (2020). Distributed Acoustic Sensing of microseismic sources and wave propagation in glaciated terrain. *Nat. Comm.* **11**, doi:10.1038/s41467-020-15824.
- Wang, M. and S. Xu (2015). Finite-difference time dispersion transforms for wave propagation. *Geophysics* **80**, WD19–WD25.
- Wang, Z. and F. A. Dahlen (1995). Spherical-spline parameterisation of three-dimensional Earth models. *Geophys. Res. Lett.* **22**, 3099–3102.
- Wapenaar, K. (2004). Retrieving the elastodynamic Green's function of an arbitrary inhomogeneous medium by cross correlation. *Phys. Rev. Lett.* **93**, 254301.
- Wapenaar, K., F. Brogini, E. Slob, and R. Snieder (2013). Three-dimensional single-sided Marchenko inverse scattering, data-driven focusing, Green's function retrieval, and their mutual relations. *Phys. Rev. Lett.* **110**, doi:10.1103/PhysRevLett.110.084301.
- Wapenaar, K. and J. Fokkema (2006). Green's function representations for seismic interferometry. *Geophysics* **71**, SI33–SI46.
- Wapenaar, K., E. Ruigrok, J. van der Neut, and D. Draganov (2011). Improved surface-wave retrieval from ambient seismic noise by multi-dimensional deconvolution. *Geophys. Res. Lett.* **38**, doi:10.1029/2010GL045523.
- Wapenaar, K., J. Thorbecke, J. van der Neut, F. Brogini, E. Slob, and R. Snieder (2014). Marchenko imaging. *Geophysics* **79**, 1WA39–WA57.
- Wapenaar, K. and J. van der Neut (2010). A representation for Greens function retrieval by multidimensional deconvolution. *J. Acoust. Soc. Am.* **128**, 366–371.
- Wapenaar, K., J. van der Neut, and E. Ruigrok (2008). Passive seismic interferometry by multidimensional deconvolution. *Geophysics* **73**, A51–A56.
- Wapenaar, K., J. van der Neut, E. Ruigrok, D. Draganov, J. Hunziker, E. Slob, J. Thorbecke, and R. Snieder (2011). Seismic interferometry by crosscorrelation and by multidimensional deconvolution: a systematic comparison. *Geophys. J. Int.* **185**, 1335–1364.
- Ware, J. A. and K. Aki (1969). Continuous and discrete inverse-scattering problems in a stratified elastic medium. i. plane waves at normal incidence. *J. Acoust. Soc. Am.* **45**, 911–921.

- Warner, M., A. Ratcliffe, T. Nangoo, J. Morgan, A. Umpleby, N. Shah, V. Vinje, I. Stekl, L. Guasch, C. Win, G. Conroy, and A. Bertrand (2013). Anisotropic 3d full-waveform inversion. *Geophysics* **78**, R59–R80.
- Warren, L. M. and P. M. Shearer (2002). Mapping lateral variations in upper mantle attenuation by stacking P and PP spectra. *J. Geophys. Res.* **107**, doi:10.1029/2001JB001195.
- Wassermann, J. (2012). Volcano seismology. In *New manual of seismological observatory practice 2 (NMSOP-2)*, pp. 1–77. Deutsches GeoForschungsZentrum GFZ.
- Weaver, R. L. (2008). Ward identities and the retrieval of Green's functions in the correlations of a diffuse field. *Wave Motion* **45**, 596–604.
- Weaver, R. L. (2011). On the amplitudes of correlations and the inference of attenuations, specific intensities and site factors from ambient noise. *C. R. Geoscience* **343**, 615–622.
- Weaver, R. L. and O. I. Lobkis (2004). Diffuse fields in open systems and the emergence of Green's function. *J. Acoust. Soc. Am.* **116**, 2731–2734.
- Weaver, R. L. and J. Yoritomo (2018). Temporally weighting a time varying noise field to improve Green function retrieval. *J. Acoust. Soc. Am.* **143**, 3706–3719.
- Weber, M. (1993). P and S wave reflections from anomalies in the lowermost mantle. *Geophys. J. Int.* **115**, 183–210.
- Wéber, Z. (2006). Probabilistic local waveform inversion for moment tensor and hypocentral location. *Geophys. J. Int.* **165**, 607–621.
- Weemstra, C., L. Boschi, A. Goertz, and B. Artman (2013). Seismic attenuation from recordings of ambient noise. *Geophysics* **78**, Q1–Q14.
- Wei, Q., N. Dobigeon, and J.-Y. Tournier (2015). Bayesian fusion of multi-band images. *IEEE J. Select. Topics Signal Proc.* **9**, doi:10.1109/JSTSP.2015.2407855.
- Wei, S., R. W. Graves, D. Helmberger, J. P. Avouac, and J. Jiang (2012). Source of shaking and flooding during the Tohoku-Oki earthquake: a mixture of rupture styles. *Earth Planet. Sci. Lett.* **333**, 91–100.
- Wei, W., J. Xu, D. Zhao, and Y. Shi (2012). East Asia mantle tomography: New insight into plate subduction and intraplate volcanism. *J. Asian Earth Sci.* **60**, 88–103.
- Wei, W., D. Zhao, J. Xu, F. Wei, and G. Liu (2015). P and S wave tomography and anisotropy in Northwest Pacific and East Asia: Constraints on stagnant slab and intraplate volcanism. *J. Geophys. Res.* **120**:3, 1642–1666.
- Welch, P. D. (1967). The use of fast Fourier transform for the estimation of power spectra: A method based on time-averaging over short, modified periodograms. *IEEE Trans. Audio Electroacoust.* **15**, 70–73.
- Wen, L. and D. V. Helmberger (1998a). A two-dimensional p-sv hybrid method and its application to modeling localized structures near the core-mantle boundary. *J. Geophys. Res.* **103**, 17,901–17,918.
- Wen, L. and D. V. Helmberger (1998b). Ultra-low velocity zones near the core-mantle boundary from broadband pkp precursors. *Science* **279**, 1701–1703.
- Whitehead, J. A. and D. S. Luther (1975). Dynamics of Laboratory Diapir and Plume Models. *J. Geophys. Res.* **80**, 705–717.
- Widiyantoro, S. and R. van der Hilst (1997). Mantle structure beneath Indonesia inferred from high-resolution tomographic imaging. *Geophys. J. Int.* **130**, 167–182.
- Widmer, R., G. Masters, and F. Gilbert (1991). Spherically symmetric attenuation within the Earth from normal mode data. *Geophys. J. Int.* **104**, 541–553.
- Wielandt, E. (1987). On the validity of the ray approximation for the interpreting delay times. In *Seismic Tomography*, pp. 85–98.
- Wiener, N. (1949). *Extrapolation, Interpolation, and Smoothing of Stationary Time Series*. Wiley, New York.
- Wiggins, R. A. (1972). The general linear inverse problem: Implication of surface waves and free oscillation structure. *Rev. Geophys. Space Sci.* **10**, 251–285.
- Williams, Q. and E. Garnero (1996). Seismic evidence for partial melt at the base of Earth's mantle. *Science* **173**, 1528–1530.
- Wolfe, C. J., I. T. Bjarnason, J. C. VanDecar, and S. C. Solomon (1997). Seismic structure of the Iceland mantle plume. *Nature* **385**, 245–247.
- Wolpert, D. H. and W. G. Macready (1997). No Free Lunch Theorems for optimization. *IEEE Trans. Evolutionary Comp.* **1**, 67–82.
- Woodard, M. F. (1997). Implications of localized, acoustic absorption for heliotomographic analysis of sunspots. *Astrophys. J.* **485**, 890–894.
- Woodhouse, J. (1983). The joint inversion of seismic wave forms for lateral variations in Earth structure and earthquake source parameter. In *Physics of the Earth's Interior*, Volume 85, Amsterdam, pp. 366–397. Int. School of Physics "Enrico Fermi": North-Holland.
- Woodhouse, J. (261–283). The coupling and attenuation of nearly resonant multiplets in the Earth's free oscillation spectrum. *Geophys. J. R. Astr. Soc.* **1980**, 61.
- Woodhouse, J. and F. Dahlen (1978a). The effect of a general aspherical perturbation on the free oscillations of the Earth. *Geophys. J.R. Astr. Soc.* **53**, 335–354.
- Woodhouse, J. and Y. Wong (1986). Amplitude, phase and path anomalies of mantle waves. *Geophys. J. R. Astr. Soc.* **87**, 753–773.
- Woodhouse, J. H. (1988). The calculation of eigenfrequencies and eigenfunctions of the free oscillations of the earth and the sun. In D. J. Doornbos (Ed.), *Seismological algorithms*, pp. 321–370. Academic Press, New York.
- Woodhouse, J. H. and F. A. Dahlen (1978b). The effect of a general aspherical perturbation on the free oscillations of the Earth. *Geophys. J. R. Astron. Soc.* **53**, 335–354.
- Woodhouse, J. H. and A. F. Deuss (2007). Theory and Observations – Earth's Free Oscillations. In *Treatise on Geophysics*, pp. doi: 10.1016/B978-044452748-6.00002-X. Elsevier.
- Woodhouse, J. H. and A. M. Dziewoński (1984). Mapping the upper mantle: Three-dimensional modeling of Earth structure by inversion of seismic waveforms. *J. Geophys. Res.* **89**, 5953–5986.
- Woodhouse, J. H., D. Giardini, and X.-D. Li (1986). Evidence for inner core anisotropy from free oscillations. *Geophys. Res. Lett.* **13**, 1549–1552.
- Woodhouse, J. H. and T. P. Girnius (1982). Surface waves and free oscillations in a regionalized earth model. *Geophys. J. R. Astron. Soc.* **78**, 641–660.

- Worthen, J., G. Stadler, N. Petra, M. Gurnis, and O. Ghattas (2014). Towards adjoint-based inversion for rheological parameters in nonlinear viscous mantle flow. *Phys. Earth Planet. Int.* **234**, 23–34.
- Wu, R. and K. Aki (1985). Scattering characteristics of elastic waves by an elastic heterogeneity. *Geophysics* **50**, 582–595.
- Wu, R.-S. and M. N. Toksöz (1987). Diffraction tomography and multisource holography applied to seismic imaging. *Geophysics* **52**, 11–25.
- Wunderman, R. (2011). Global Volcanism Program, 2011. Report on Grimsvotn (Iceland). *Bull. Glob. Volc. Network* **36**, doi.org/10.5479/si.GVP.BGVN201106–373010.
- Wysession, M. E., M. Fischer, G. I. Al-eqabi, and P. Shore (2000). Using MOMA broadband array ScS-S data to image smaller-scale structures at the base of the mantle. *Geophys. Res. Lett.* submitted.
- Xu, Z., T. D. Mikesell, G. Gribler, and A. Mordret (2019). Rayleigh-wave multicomponent cross-correlation-based source inversion. Part 1: Theory and numerical examples. *Geophys. J. Int.* **218**, 1761–1780.
- Yamazaki, Y., T. Lay, K. F. Cheung, H. Yue, and H. Kanamori (1997). Modeling near-field tsunami observations to improve finite-fault slip models for the 11 March 2011 Tohoku earthquake. *Geophys. Res. Lett.* **33**, doi:10.1029/2011GL048701.
- Yan, Z. and R. W. Clayton (2007). A notch structure of the Moho beneath the eastern San Gabriel mountains. *Earth Planet. Sci. Lett.* **260**, 570–581.
- Yang, Y., J. W. Atterholt, Z. Shen, J. B. Muir, E. F. Williams, and Z. Zhan (2021). Sub-kilometer correlation between near-surface structure and ground motion measured with distributed acoustic sensing. *Geophys. Res. Lett.* **49**(1), doi:10.1029/2021GL096503.
- Yang, Y., D. W. Forsyth, and D. S. Weeraratne (2007). Seismic attenuation near the East Pacific Rise and the origin of the low-velocity zone. *Earth Planet. Sci. Lett.* **268**, 260–268.
- Yang, Y. and M. H. Ritzwoller (2008). Characteristics of ambient seismic noise as a source for surface wave tomography. *Geochem. Geophys. Geosyst.* **9**(2), doi:10.1029/2007GC001814.
- Yanovskaya, T. B. (1997). Resolution estimation in the problems of seismic ray tomography. *Izvestiya Phys. Solid Earth* **33**, 76–80.
- Yanovskaya, T. B. (2000). Development of methods for surface wave tomography based on the Backus-Gilbert approach. In *Computational Seismology and Geodynamics, Vol. 7*, pp. 5–16. American Geophysical Union.
- Yanovskaya, T. B., T. Koroleva, and E. Lyskova (2016). Effect of earthquakes on ambient noise surface wave tomography in upper-mantle studies. *Geophys. J. Int.* **205**, 1208–1220.
- Yao, H. and R. D. van der Hilst (2009). Analysis of ambient noise energy distribution and phase velocity bias in ambient noise tomography, with application to SE Tibet. *Geophys. J. Int.* **179**, 1113–1132.
- Yarvin, N. and V. Rokhlin (1998). A generalize one-dimensional fast multipole method with applications to filtering of spherical harmonics. *J. Comp. Phys.* **147**, 594–609.
- Ying, J. (1996). *Tomographie par diffraction et détection de panaches mantelliques dans le manteau inférieur*. Thèse de doctorat de l'Université Paris 7.
- Ying, J. and H. C. Nataf (1998). Detection of mantle plumes in the lower mantle by diffractive tomography: theory. *Phys. Earth Planet. Inter.* **159**, 87–98.
- Yolsal-Çevikbilen, S., C. B. Biryol, S. Beck, G. Zandt, T. Taymaz, H. E. Adiyaman, and H. E. Özacar (2012). 3-D crustal structure along the North Anatolian Fault Zone in north-central Anatolia revealed by local earthquake tomography. *Geophys. J. Int.* **188**, 819–849.
- Yomogida, K. (1992). Fresnel zone inversion for lateral heterogeneities in the Earth. *Pure Appl. Geophys.* **138**, 391–406.
- Yoritomo, J. Y. and R. L. Weaver (2016). Fluctuations in the cross-correlation for fields lacking full diffusivity: The statistics of spurious features. *J. Acoust. Soc. Am.* **140**, 702–713.
- Yoshida, H. (1990). Construction of higher-order symplectic integrators. *Phys. Lett. A* **150**, 262–268.
- Yoshizawa, K. and G. Ekström (2010). Automated multimode phase speed measurements for high-resolution regional-scale tomography: application to North America. *Geophys. J. Int.* **183**, 1538–1558.
- Yoshizawa, K. and B. L. N. Kennett (2004). Multi-mode surface wave tomography for the Australian region using a 3-stage approach incorporating finite-frequency effects. *J. Geophys. Res.* **109**, doi:10.1029/2002JB002254.
- Yoshizawa, K. and B. L. N. Kennett (2005). Sensitivity kernels for finite-frequency surface waves. *Geophys. J. Int.* **162**, 910–926.
- Yoshizawa, K., K. Miyake, and K. Yomogida (2010). 3D upper mantle structure beneath Japan and its surrounding region from inter-station dispersion measurements of surface waves. *Phys. Earth Planet. Inter.* **183:1-2**, 4–19.
- Yu, J. H., Y. Wang, and G. T. Schuster (2002). Deconvolution of the psf of a seismic lens. in: *Image Reconstruction from Incomplete Data*, Eds. P. J. Bones, M. A. Fiddy and R. P. Millane **4792**, 135–145.
- Yu, Y. and J. Park (1993). Upper mantle anisotropy and coupled-mode long-period surface waves. *Geophys. J. Int.* **126**, 389–412.
- Yuan, Y. O., F. J. Simons, and E. Bozdağ (2015). Multiscale adjoint waveform tomography for surface and body waves. *Geophysics* **80**, R281–R302.
- Zaroli, C. (2019). Seismic tomography using parameter-free Backus-Gilbert inversion. *Geophys. J. Int.* **218**, 619 – 630.
- Zaroli, C., P. Koelemeijer, and S. Lambotte (2017). Towards seeing the Earth's interior through unbiased tomographic lenses. *Geophys. Res. Lett.* **44**, doi:10.1002/2017GL074996.
- Zhan, Z., V. C. Tsai, and R. W. Clayton (2013). Spurious velocity changes caused by temporal variations in ambient noise frequency content. *Geophys. J. Int.* **194**, 1574–1581.
- Zhang, B., J. Zerubia, and J. C. Olivo-Marin (2007). Gaussian approximation of fluorescence microscope point-spread function models. *Appl. Opt.* **46**, 1819–1829.
- Zhang, S. and S.-I. Karato (1996). Lattice preferred orientation of olivine aggregates deformed in simple shear. *Nature* **375**, 774–777.
- Zhang, X. and A. Curtis (2020). Variational full-waveform inversion. *Geophys. J. Int.* **222**, 406–411.
- Zhang, X., H. Paulssen, S. Lebedev, and . Meier (2007). Surface wave tomography of the Gulf of California. *Geophys. Res. Lett.* **34**, doi:10.1029/2007GL030631.

- Zhang, Y. and C. A. Sutton (2011). Quasi-Newton Methods for Markov Chain Monte Carlo. In J. Shawe-Taylor, R. S. Zemel, P. L. Bartlett, F. Pereira, and K. Q. Weinberger (Eds.), *Advances in Neural Information Processing Systems*, pp. 2393–2401. Curran Associates, Inc.
- Zhang, Y. and T. Tanimoto (1993). High-Resolution Global Upper Mantle Structure and Plate Tectonics. *J. Geophys. Res.* **98**, 9793–9823.
- Zhao, D. (2004). Global tomographic images of mantle plumes and subducting slabs: insight into deep earth dynamics. *Phys. Earth Planet. Inter.* **146:1-2**, 3–34.
- Zhao, D., S. Maruyama, and S. Omori (2007). Mantle dynamics of Western Pacific and East Asia: Insight from seismic tomography and mineral physics. *Gondwana Res.* **11**, 120–131.
- Zhao, D. and E. Ohtani (2009). Deep slab subduction and dehydration and their geodynamic consequences: Evidence from seismology and mineral physics. *Gondwana Res.* **16**, 401–413.
- Zhao, D. and Y. Tian (2013). Changbai intraplate volcanism and deep earthquakes in East Asia: a possible link? *Geophys. J. Int.* **195**, 706–724.
- Zhao, L., P. Chen, and T. H. Jordan (2006). Strain Green's tensors, reciprocity, and their applications to seismic source and structure studies. *Bull. Seis. Soc. Am.* **96**, 1753–1763.
- Zhao, L. and F. Dahlen (1996). Mode-sum to ray-sum transformation in a spherical and an aspherical earth. *Geophys. J. Int.* **126**, 389–412.
- Zhao, L., T. H. Jordan, and C. H. Chapman (2000). Three-dimensional Fréchet differential kernels for seismic delay times. *Geophys. J. Int.* **141**, 558–576.
- Zhao, L., T. H. Jordan, K. B. Olsen, and P. Chen (2005). Fréchet kernels for imaging regional earth structure based on three-dimensional reference models. *Bull. Seismol. Soc. Am.* **95**, 2066–2080.
- Zhao, S., R. D. Muller, Y. Takahashi, and Y. Kaneda (2004). 3-D finite-element modelling of deformation and stress associated with faulting: Effect of inhomogeneous crustal structures. *Geophys. J. Int.* **157**, 629–644.
- Zheng, Y., W. Shen, L. Zhou, Y. Yang, Z. Xie, and M. Ritzwoller (2011). Crust and uppermost mantle beneath the North China Craton, northeastern China, and the Sea of Japan from ambient noise tomography. *J. Geophys. Res.* **116**.
- Zhou, C., W. Cai, Y. Luo, G. T. Schuster, and S. Hassanzadeh (1995). Acoustic wave-equation traveltimes waveform inversion of crosshole seismic data. *Geophysics* **60**(3), 765–773.
- Zhou, Y. (2009a). Multimode surface wave sensitivity kernels in radially anisotropic Earth media. *Geophys. J. Int.* **176**, 865–888.
- Zhou, Y. (2009b). Surface-wave sensitivity to 3-D anelasticity. *Geophys. J. Int.* **178**, 1403–1410.
- Zhou, Y., F. A. Dahlen, and G. Nolet (2004). Three-dimensional sensitivity kernels for surface wave observables. *Geophys. J. Int.* **158**, 142–168.
- Zhou, Y., Q. Lui, and J. Tromp (2011). Surface-wave sensitivity: Mode summation versus adjoint SEM. *Geophys. J. Int.* **187**, 1560–1576.
- Zhou, Y., G. Nolet, F. A. Dahlen, and G. Laske (2006). Global upper-mantle structure from finite-frequency surface-wave tomography. *J. Geophys. Res.* **111**, doi:10.1029/2005JB003677.
- Zhu, H., E. Bozdağ, T. S. Duffy, and J. Tromp (2013). Seismic attenuation beneath Europe and the North Atlantic: Implications for water in the mantle. *Earth Planet. Sci. Lett.* **381**, 1–11.
- Zhu, H., E. Bozdağ, D. Peter, and J. Tromp (2012). Structure of the European upper mantle revealed by adjoint tomography. *Nat. Geosc.* **5**, 493–498.
- Zhu, H., E. Bozdağ, and J. Tromp (2015). Seismic structure of the European upper mantle based on adjoint tomography. *Geophys. J. Int.* **201**, 18–52.
- Zhu, L. (2000). Crustal structure across the San Andreas Fault, southern California, from teleseismic converted waves. *Earth Planet. Sci. Lett.* **179**, 183–190.
- Zhu, L. and X. Zhou (2016). Seismic moment tensor inversion using 3D velocity model and its application to the 2013 Lushan earthquake sequence. *Phys. Chem. Earth* **95**, doi:10.1016/j.pce.2016.01.002.
- Zhu, Y., I. Tsvankin, and I. Vasconcelos (2007). Effective attenuation anisotropy of thin-layered media. *Geophysics* **72**, D93–D106.
- Zielhuis, A. and G. Nolet (1994a). Deep seismic expression of an ancient plate boundary in Europe. *Science* **265**, 79–81.
- Zielhuis, A. and G. Nolet (1994b). Shear-wave velocity variations in the upper mantle beneath central Europe. *Geophys. J. Int.* **117**, 695–715.
- Zienkiewicz, O. and K. Morgan (1983). *Finite elements approximation*. New-York: John Wiley and Sons.
- Zunino, A., F. Benvenuto, E. Armadillo, M. Bertero, and E. Bozzo (2009). Iterative deconvolution and semiblind deconvolution methods in magnetic archaeological prospecting. *Geophysics* **74**(4), L43–L51.
- Zunino, A. and K. Mosegaard (2018). Integrating gradient information with probabilistic traveltimes tomography using the Hamiltonian Monte Carlo algorithm. *80th EAGE Conference & Exhibition, Copenhagen*.

---

Manuscript Received 00 Month 0000