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BSSA tip sheet for April 2012 issue:
Seismic hazards assessed for Central America, San Jacinto Fault Zone unveiled by LiDAR

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New seismic hazard assessment for Central America

A new study evaluates the seismic hazards for the entire Central America, including specific assessments for six capital cities, with the greatest hazard expected for Guatemala City and San Salvador, followed by Managua and San José, and notably lower in Tegucigalpa and Panamá City.

The study, published in the April issue of the Bulletin of the Seismological Society of America (BSSA), included input from seismic hazard experts from Costa Rica, Guatemala, Honduras, Nicaragua, El Salvador, Panama, Norway and Spain. All seismic experts from Central American countries, except Belize, agree with the study's assessments.

The paper outlines the work carried out as part of the cooperation project named RESIS II, under the auspices of the Norway Cooperation Agency (NORAD), with a contribution of the Technical University of Madrid (UPM). A new regional seismic catalog and a strong motion database updated up to December 2010 have been developed.

A seismogenic zonation has been proposed for the entire region, considering the three tectonic settings (crust, subduction interface and inslab), with zones defined at a national level and coherent at a regional scale, avoiding discontinuities along the national boundaries.

This is the first study developed in Central America at a regional scale this century and the first done in terms of peak ground acceleration (PGA) and different spectral acceleration values for the entire region. The study provides new information that is being considered in the revision of national seismic codes and it is also supported by the Coordination Centre for Natural Disasters Prevention in Central America (CEPREDENAC).

"A New Evaluation of Seismic Hazard for the Central America Region," by M. B. Benito, Universidad Politécnica de Madrid, Spain; C. Lindholm, NORSAR, Oslo, Norway; E. Camacho, Universidad de Panamá (UPA), Panamá ; Á. Climent, Instituto Costarricense de Electricidad (ICE) , San José, Costa Rica; G. Marroquín, Servicio Nacional de Estudios Territoriales (DGSNET), San Salvador, El Salvador; E,
Molina, Instituto de Sismología, Vulcanología, Meteorología e Hidrología (INSIVUMEH), Guatemala; W, Rojas, Universidad de Costa Rica (UCR); J.J. Escobar, Universidad de Honduras; E. Talavera, Instituto Nacional de Estudios Territoriales (INETER), Managua, Nicaragua; G.E. Alvarado, Red Sismológica Nacional de Costa Rica; Y. Torres, Universidad Politécnica de Madrid, Spain.

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Pattern of large earthquakes on San Jacinto fault identified with help of LiDAR

The San Jacinto Fault (SJF) Zone is a seismically active, major component of the overall southern San Andreas Fault system. Researchers from San Diego State University (SDSU) and U.S. Geological Survey have mapped evidence of past ruptures consistent with very large earthquakes along the Clark Fault, an individual strand associated with the SJF.

James Barrett Salisbury, now at Arizona State University and formerly a graduate student at SDSU, and his colleagues mapped the terrain by using both LiDAR and traditional field methods in order to determine the usefulness of LiDAR, which is an aerial mapping technology that emits laser pulses from an instrument

mounted in an airplane. The laser pulses penetrate dense vegetation, allowing

for the vegetation to be removed in data processing to yield high-resolution images of the Earth's surface. LiDAR is especially useful for analyzing rugged, poorly accessible terrain.

Salisbury and his colleagues identified geomorphic evidence that suggests three large seismic events at evenly spaced intervals along the Clark Fault. This evidence correlates with previous research by co-author Tom Rockwell who dated events at the Hog Lake paleoseismic site near Anza, Calif.

Salisbury et al., infer that Nov. 22, 1800 is the date of the most recent surface rupturing earthquake event on the Clark fault. It correlates to the poorly located historic event recorded in southern California, and generally corresponds to the most recent event date at Hog Lake, which is radiocarbon dated at ca. 1790.

"LiDAR and Field Observations of Slip Distribution for the Most Recent Surface Ruptures along the Central San Jacinto Fault," is published in the April issue of the Bulletin of the Seismological Society of America (BSSA). The authors are J. B. Salisbury, T. K. Rockwell and T.J. Middleton at San Diego State University; and K.W. Hudnut at U.S. Geological Survey.

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