ESC2016-705, 2016
35th General Assembly of the European Seismological Commission

35th General Assembly of the European Seismological Commission
4–10 September 2016 Trieste

Coseismic Ground effects of the 2016 Mw 7.8 Pedernales Earthquake (Ecuador)

Kervin Chunga (1), Maurizio Mulas (1), Davide Besenzon (1), Alexander Gorshkov (2), Carola Gordillo (1), and Glenda Loayza (1)

(1) Escuela Superior Politécnica del Litoral, Facultad de Ingeniería en Ciencias de la Tierra, Campus Gustavo Galindo, Ecuador. , (2) Institute of Earthquake Prediction Theory and Mathematical Geophysics, Moscow, Russian Federation

On April 16, 2016, a strong subduction earthquake (Mw 7.8; nucleation depth 20 km; source IGEPN, www.igepn.edu.ec) hit the whole Manabí coastal region and southern part of the Esmeraldas province, Ecuador (South America) at 18h58 PM local time. This earthquake was felt on the borders of Peru and Colombia. The epicentral area includes the coast town of Pedernales and its surrounding communities of Coaque, Jama and Canoa, and where major earthquake environmental effects (EEE) were induced, as well as moderate pressure undulations in waterfront areas (ie, cobbles accommodated as folds), transverse fractures (rupture sense in highway) up to 10 – 16 cm wide are commonly observed in concrete road, of up 20 a 35 cm wide in asphalt road, open ground cracks in loose alluvial deposit reach up to 100 cm wide; a maximum intensity of IX ESI2007 (Environmental Seismic Intensity Scale, Michetti et., 2007), has been assigned to this area. The VIII ESI2007 intensities are assigned to Briceño, San Vicente, San Isidro, Ricaurte, Chone, Manta, Tosagua, Rocafuerte, Muisne, Chamanga sites, where significant ground effects were small and modest landslides and rock falls widespread in prone areas of unstable slopes and some sectors where their sizes reached up to 8.000 - 10.000m3, liquefaction and water upsurge were frequent and the sand boils up to 55 – 80 cm in diameters (ie, Muisne and Tosagua), lateral spreading and settlements with fissuring parallel (ca. 25 cm wide) to beachfront areas caused collapse of many houses (ie., Chamanga), numerous sinkholes up to 2.5 m in diameters, longitudinal and transverse fractures in asphalt roads up to 10 – 15 cm wide, the cracks on alluvial soils reached 20 cm wide and on supratidal zone sandy beach reached 25 cm wide (ie, Cojimies), also surface faulting were developed in the road at San Isidro, with right lateral offset of 35 cm. The VII ESI2007 intensities are assigned to Bahia de Caraquez, San Jacinto, Manta, Portoviejo, Junin, Calceta, Chone, Zapallo, Jaramijo, Pavon, Guachal, Cheve Abajo, Morascumbo, Pueblo Nuevo – Chamanga sities, the most notable ground effects were small rock falls and landslides less than 250 m3, longitudinal fractures of up to 1 – 2 cm wide are sporadically and regularly observed in asphalt road, very small pressure undulations of cobbles accommodated as folds are evidenced in supratidal zones and lateral spreading with settlements with fissuring parallel (ca. 10 cm wide) in riverbanks (ie., Calceta). The VI ESI2007 intensities are assigned to Cube, Tacusa, Colope, southern part of the Esmeraldas province. The application of the ESI2007 Scale has allowed construct an independent Macroseismic field where all coseismic ground data are well confronted with those intensities obtained from European macroseismic scale (EMS98).