ABSTRACTS

O206 InSAR analysis of Ecuador Earthquake using Sentinel 1A imagery

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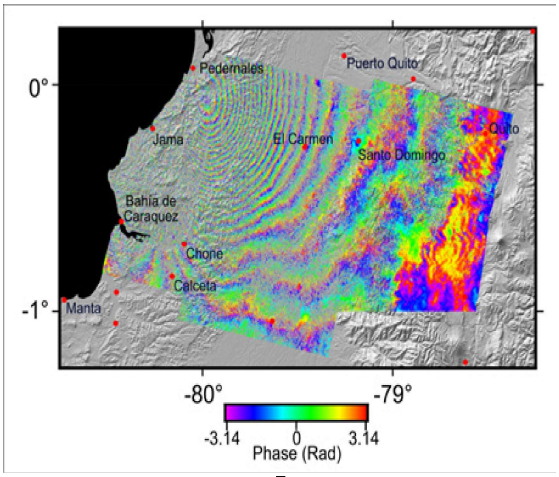
On April 16 2016 Ecuador was shaken by the most powerful earthquake of the last 40 years at a depth of 19km, and the fatality count has reached 660 based on United Nations reports (OCHA). The epicenter was centered approximately 27km from the towns of Muisne and Pedernales and 170km from the capital Quito. The mainshock registered magnitude of 7.8Mw and was followed by subsequent aftershocks that reached 6.1-6.2 magnitude ~25km west of Muisne around 3:30am local time.



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ig. 1: Sentinel-1A interferogram of the ground deformation due to the April 16th earthquake, Pedernales, Ecuador

During earthquakes the earth's surface is deformed; synthetic aperture radar interferograms (InSAR) technology can measure this vertical movement of the crust using two images of the same area taken at different dates, one before the earthquake and the other one after the shock. We used radar images from the ESA Sentinel 1A satellite to compute coseismic interferograms of the very April 16 Ecuador earthquake. In Fig. 1 the first image was taken on 29 March 2016 before the earthquake and the second one on 24 April after the earthquake had occurred, both in descending orbit wide swath mode. This mode images in three sub-swaths using the Terrain Observation with Progressive Scans SAR or TOPSSAR. On the interferogram shown the rainbow-colored fringes, can be similarly interpreted as the elevation contours;the topography is deducted in either image in order to only reveal the elevations changes that were caused by the earthquake. The focal parameters of the earthquake determined by GCMT are consistent with rupture along the plate interfaceof the convergent plate boundary, where the Nazca Plate is subducting beneath the South American Plate. The megathrust earthquake ruptured approximately the same area as major earthquake that occurred in 1942. In this study we present the preliminary results of the deformation maps and modeling to estimate the slip distribution of the mainshock. The data include InSAR ascending and descending orbits.