

Geometry and kinematics of the shallow northern segment of the Quito Fault System

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The Quito Fault System (QFS) lies beneath the Ecuadorean capital of Quito and threatens more than 2 million inhabitants in the area. Previous studies based on the seismicity and morphology of the area characterize a primarily reverse faulting tectonic regime, with individual faults oriented mostly N-S (Calahorrano, 2001; Alvarado et. al., 2014). In recent years, seismic activity near the Bellavista-Catequilla segment along the northern QFS has shown both intense seismic activity with thousands of earthquakes with magnitudes less than 4.1 (Calahorrano, 2001) and traditional mainshock-aftershock sequences. The most important recent example of the latter is the 2014 MLv 5.1 earthquake. A temporary network of five seismic stations captured hundreds of aftershocks within two month of the main event. In this study, we utilize data from both the temporary network and already existing background stations and determine precise locations for the largest aftershocks in the sequence. Relocated hypocenters locate primarily between 4 and 12 km depth and delineate a plane dipping $\sim 65^\circ$ to the west. Additionally, we determine focal mechanisms based on first arrival polarities. For the ~ 19 largest events, focal mechanisms indicate reverse faulting along \sim NNE striking fault. The shallow geometry and kinematics of the fault determined from this study are largely consistent with previous work from the area.

Calahorrano, A (2001). Estudio del origen del enjambre sísmico de la zona norte de la ciudad de Quito, durante 1998 - 1999. Tesis de ingeniería. Escuela Politécnica Nacional - Quito: 190pp.

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