



Active tectonics in Quito, Ecuador, assessed by geomorphological studies, GPS data, and crustal seismicity

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The Quito Fault System (QFS) is an intraplate reverse fault zone, that extend over 60km along the Interandean Depression in northern Ecuador. Multidisciplinary studies coherently support an interpretation in which two major contemporaneous fault systems affect Quaternary volcanoclastic deposits. Hanging paleovalleys and disruption of drainage networks attest to ongoing crustal deformation and uplift in this region, further confirmed by 15 years of GPS measurements and seismicity. The resulting new kinematic model emphasizes the role of the NS segmented, en-echelon eastward migrating Quito Fault System (QFS). Northeast of this major tectonic feature, the strike-slip Guayllabamba Fault System (GFS) aids the eastward transfer of the regional strain toward Colombia. These two tectonic fault systems are active and the local focal mechanisms are consistent with the direction of relative GPS velocities and the regional stress tensor. Among active features, inherited NS direction sutures appear to play a role in confining the active deformation in the Interandean Depression. The most frontal of the Quito faults formed at the tip of a blind thrust, dipping 40°W, is most probably connected, at depth, to inactive suture to the west. A new GPS dataset indicates active shortening rates for Quito blind thrust of up to 4mm/yr, which decreases northwards along the fold system as it connects to the strike slip Guayllabamba Fault System. The proximity of these structures to the densely-populated Quito region underlines the need of additional tectonic studies in these regions of Ecuador to generate further hazard assessments.