



Hazardous faults of South America; compilation and overview

Carlos Costa^{a,*}, Alexandra Alvarado^b, Franck Audemard^{c,1}, Laurence Audin^d,
Carlos Benavente^e, F. Hilario Bezerra^f, José Cembrano^g, Gabriel Gonzálezⁱ, Myriam López^j,
Estela Minaya^{k,2}, Isabel Santibañez^{g,2}, Julio García^h, Mónica Arcila^j, Marco Pagani^h,
Irene Pérez^l, Fabrizio Delgado^e, Mónica Paolini^{c,3}, Hernán Garro^a

^a Universidad Nacional de San Luis, San Luis, Argentina

^b Instituto Geofísico-Escuela Politécnica Nacional, Quito, Ecuador

^c (a) Fundación Venezolana de Investigaciones Sismológicas, Caracas, Venezuela

^d IRD-ISTerre, Grenoble, France

^e Instituto Geológico, Minero y Metalúrgico, Lima, Peru

^f Universidad Federal do Rio Grande do Norte, Natal, Brazil

^g Pontificia Universidad Católica, Santiago, Chile

^h Centro de Investigación para la Gestión Integrada de Riesgo de Desastres, Universidad Católica del Norte, Antofagasta, Chile

ⁱ Servicio Geológico Colombiano, Bogotá, Colombia

^j Observatorio San Calixto, La Paz, Bolivia

^k GEM Foundation, Pavia, Italy

^l Instituto Nacional de Prevención Sísmica, San Juan, Argentina

ARTICLE INFO

Keywords:

Hazardous faults
South America
Neotectonics
Seismic hazard

ABSTRACT

The heterogeneous South American geology has coined a wide variety of neotectonic settings where crustal seismogenic sources do occur. This fact has led to different approaches for mapping and inventory neotectonic structures. The South American Risk Assessment project promoted the discussion and update under uniform standards of the available information on neotectonic deformation, for its application in regional Probabilistic Seismic Hazard Assessments. As a result, 1533 hazardous faults have been inventoried onshore South America, 497 of them qualifying to feed the engine model driving probabilistic maps.

Main hazardous structures are concentrated throughout the eastern boundary of the Northern Andean Sliver and along the foreland-facing Andean Thrust Front. Space geodesy and seismicity illuminate the seismogenic significance of these deformation belts, although few neotectonic surveys have been conducted to date in the latter region. The characteristics of the main structures or deformation zones are here outlined according to their filiation to neotectonic domains, which are dependant on the geologic, seismotectonic, or morphotectonic settings in Andean and extra-Andean regions.

The knowledge accrued on the hazardous faults in South America here compiled, reinforces the fact that some of these structures constitute significant hazard sources for many urban areas and critical facilities and should be incorporated in seismic hazard assessments. However, the available fault data are insufficient in many cases or carry significant epistemic uncertainties for fault source characterization. This contribution aims to summarize the present knowledge on the South American hazardous faults as well as the main challenges for successful fault data incorporation into seismic hazard models.

* Corresponding author.

E-mail addresses: costa@unsl.edu.ar, mailcarloscosta@gmail.com (C. Costa).

¹ Now at Universidad Central de Venezuela, Caracas, Venezuela.

² Now as Independent Geologist.

³ Now at AguaEx, Santiago, Chile.