

# ***Interactive comment on “Seismic hazard in low slip rate crustal faults, estimating the characteristic event and the most hazardous zone: study case San Ramón fault, in central Andes” by Nicolás P. Estay et al.***

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## General Comments

The article presents an evaluation of the seismic risk that the San Ramón fault represents for the city of Santiago, considering this fault as a segmented structure. As such, it evaluates the chances of an eventual earthquake caused by the movement of a particular segment of the fault instead of an overall rupture all along the fault length.

The paper meets the basic standard to be published but it needs more work in order to clarify some concepts, to carry a more detailed discussion regarding some topics, to

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improve the presentation of figures and their captions.

### Specific Comments

The authors use several valid geophysical and geomorphological methods to evaluate the geometry in the fault in order to define segmentation. However, the manuscript lacks in detail about the assumptions they made or the data they use as a base for the analysis they carried out (There's no reference on the topographic data they used, neither the parameters considered about gravimetric measurements). So there is not traceability of results in these analyses.

The authors must discuss in detail their results regarding those of previous works in the area, in this case they are not discussing, nor contrasting, the results of PGA they obtained assuming a rupture in a segment of the fault with those obtained by Pérez et al. (2014) assuming the worst case scenario. Since both results are numerically similar but are results of different cases.

The authors must present the location of TEM profile in a figure, in order to pinpoint the spatial relation between SRF and the profile.

There is no consensus about the concept of a fault's activity. Nevertheless, it is usually understood as the possibility of a fault causing an earthquake in the future. A fault is usually considered active if it presents evidence of displacements during the Holocene. As a suggestion, the authors could be more specific when stating the kind of activity they are discussing about the San Ramón fault, considering the fact that if the fault does not present seismic activity is not enough evidence to state the fault is not active. And several previous works states that the fault is geologically active. For a further discussion on this topic, the following authors and works could be considered if they are willing to discuss it: Burbank, D.; Anderson, R. (2012). *Tectonic Geomorphology*. Blackwell Science. McCalpin, J. P. (2009). *Paleoseismology* (2nd ed.). San Diego: Elsevier. PMA. (2008). *Atlas de deformaciones cuaternarias de los Andes*. *Publicación Geológica Multinacional*, No 7. *Proyecto Multinacional Andino: Geociencias*



para las Comunidades Andinas. Servicio Nacional de Geología y Minería. Wallace, R.E. (1986). Active tectonics: studies in Geophysics. National Academy of Science. Washington. Yeats, R.S.; Sieh, K.; Allen, C.R. 1997. The geology of earthquakes. Oxford University Press: p. 499. New York.

Both tectonic activity and the deformation produced by a fault are concepts associated to an observation or measurement which refers to a certain period of time. In the case of this article in particular this last time variable remains undiscussed and so the results are valid only for a fixed impression of the phenomena it observes and cannot be associated to a measurement of deformation rates.

#### Technical corrections

References: I didn't perform an in depth review of all the references, but I did find some points that I included in the PDF as comments. About figures: There are some figure captions that needs improvements, authors must give more detailed explanations about figure content. I strongly suggest using a grayscale hillshade as background, replacing the coloured hillshade in every map so that people who are colour blind can read the figure. I also suggest using (a), (b), (c), (d), (e)..., to name panels in figures. If the authors use this format on captions, it will make them clearer.

I included several comments in the PDF about specific comments and technical corrections.

Please also note the supplement to this comment:

<http://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2016-19/nhess-2016-19-RC1-supplement.pdf>

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