

Active faults more accessible to geologists

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The October *GSA Today* science paper introduces the "Active Tectonics of the Andes Database," which will provide more data to more geoscientists.

Understanding important aspects of how the Earth works—in this case, hazards associated with active seismic fault zones—is greatly improved by free and open access to the many types of spatial and geological data collected by geologists. While some [geophysical data](#), such as that obtained from seismograms of earthquakes, have long been widely available in digital form, the geological information that is needed to better understand the long-term history and evolution of deformation in fault zones is often not widely or freely available.

The diverse range of geological data—rock types and ages, fault locations and orientations, slip-direction from faults, geometry of other features such as folds and bedding planes—are often difficult to compile and assemble into useful digital forms.

Some of the most important questions and issues that can be addressed with these digital compilations of geological data include comparison of the direction and velocity of surface displacement measured by [Global Positioning System](#) receivers (GPS) with the location, orientation, and type of [fault zone](#) observed in the geological data. While the [GPS data](#) provide excellent coverage of the modern-day surface motion associated with plate boundary zones, many faults and fault zones have longer-term histories of displacement. For example, many fault zones have geological records of large earthquakes that have long, and sometimes variable,

recurrence rates that cannot be adequately studied using short-term data from GPS.

In order to really understand the seismic hazards associated with faults that have long-term slip histories, evidence from the [geological record](#) must be used. In the October 2012 issue of *GSA Today*, graduate students Gabriel Veloza and Richard Styron, and their faculty advisor, Michael Taylor, from the Dept. of Geology at the University of Kansas, and Andrés Mora from the Instituto Colombiano del Petroleo in Colombia, present a detailed digital compilation of active faults and other geological feature from the NW portion of South America.

Their work—the Active Tectonics of the Andes Database—includes the locations and associated geological information for more than 400 mapped faults in this region. The digital nature of these data allow modern mapping tools, including Google Earth, to depict these faults and to include other forms of data, such as GPS velocities, earthquake locations, and plate motion data. This new database will allow access by many other [geoscientists](#) and will promote a better understanding of the different seismic hazards in this region of South America. For example, comparison of fault zone locations and orientations with GPS-based displacements has led Veloza's team to recognize several zones with different displacement behavior and relate these to changes in plate motions and plate boundary orientation.

More information: Open-source archive of active faults for northwest South America, Gabriel Veloza et al., [doi: 10.1130/GSAT-G156A.1](https://doi.org/10.1130/GSAT-G156A.1)

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