



Deep image of the West Fissure Fault System in Northern Chile and its role in the fluid flow toward the upper crust

Pablo Salazar (1,2), Joern Kummerow (1), Peter Wigger (1), Dorothee Moser (1), Guenter Asch (3), and Serge Shapiro (1)

(1) Department of Geophysics, Freie Universitaet Berlin, Berlin, Germany (pablo@geophysik.fu-berlin.de), (2) Department of Geology, Universidad Catolica del Norte, Antofagasta, Chile, (3) GeoForschungsZentrum Potsdam, Potsdam, Germany

We present a new image of the deep part of the West Fissure Fault System (WFFS) in northern Chile. Our study is based on the upper crustal microseismicity, which has been obtained by a temporary short-period seismic network installed between 2005-2009, around 21°S. The network consists of twelve 3-component stations which have been recording continuously.

The characterization of this structure has been obtained, besides of the seismicity distribution, by focal mechanisms and stress tensor analysis. The origin of its particular geometry could be a tectonic response to differences in rheological behaviour of the crust.

The stress tensor analysis shows, in agreement with the geological studies, that the western part of the WFFS is subjected to a transpressional regime, whereas the east side is subjected to a transtensional regime, which would be associated with the thickened crust below the Andean plateau.

Also two clusters have been identified and analysed with statistical methods in order to constrain the source of this seismicity, which could be related to fluid migration through of this fault system.

We interpret the deeper part of the WFFS as a westward-dipping compressive structure which follows the lower boundary of the seismicity, generating seismic clusters which could be related to the transport of fluids toward the upper crust.