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Microseismicity in the West Fissure fault system, Northern Chile

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The West Fissure fault system (WF) is one of the principal structural features in Northern Chile. The WF pertains to a fault system located in the Precordillera with a predominant N-S orientation and with associated strike-slip movements. The total length of the fault system is more than 1000 km. In spite of its geological/tectonic importance, however, very poor evidence of its seismic activity is known. Present studies focus on the intermediate-depth seismicity associated with the subduction of the Nazca Plate beneath the South American Plate (e.g., the Tarapacá earthquake on 13 June, 2005 [*Peyrat et al.,* 2006]). In order to monitor seismicity at a segment of the WF, we have installed a temporary seismic network in November 2005. It will continue recording throughout the year 2007. The network is located at $\sim$21°S and covers an area of about 50x50km. This area was traversed by the geophysical ANCORP transect [*ANCORP Working Group, 2003*]. The seismic network consists of 12 3-component instruments, which record continuously at a sample rate of 200 Hz. We observe upper crustal microseismicity, which can partly be associated with the WF. The local magnitudes, Ml, of the earthquakes range between -1 and 2. Among the detected events we found an earthquake swarm consisting of $\sim$120 events, that occurred between March 31, and April 28, 2006. These events exhibit very high waveform similarity. Accurate relocation shows that they cluster in a narrow zone ($<$1km width) at $\sim$10km depth. It may be speculated, that the swarm was triggered by a magnitude Mb=5.3 event, that occurred south of Pica at 58km depth on March 27, 2006 (about 40km west of the swarm locations). We also determined focal mechanisms for some events based on polarity of P and S wave arrivals and amplitude ratios (SV/P, SH/P and SV/SH)

[*Snoke, 2003*]. Preliminary results show that the mechanisms are strike-slip and consistent with WF fault motion postulated from geological studies.