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The 2008 Balochistan sequence and its relationships with the CFF

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In this study we analyse the 2008 Balochistan (western Pakistan) seismic sequence by means of DInSAR technique, focusing the attention on the source modelling and the stress transfer between adjacent faults. This sequence is characterized by two Mw 6.4 events on October 28 and 29 and a Mw 5.7 foreshock on December 9.
The most seismically active regions of Balochistan are Quetta Syntaxis and the Sulaimam Lobe. These areas are tectonically located between the Indian Plate and the Afghan block of the Eurasian Plate. The Indian plate moves northward at the rate of 38 mm/yr and the collision with the Afghan block underlies the tectonic features in northern and western Pakistan.
The complex converging movements of the two plates reflect in a wide range of fault mechanisms, with a major role played by the left lateral Chaman Fault System, at west of Quetta.
The Sulaimam Lobe shows a diffuse deformation due to a southward motion; this extrusion is accommodated along its eastern margin by the left-lateral Kingri fault system. On the other side, in the Quetta Syntaxis, a right-lateral tectonic regime characterizes the western margin of the Lobe.
Seismicity in Quetta Syntaxis occurs in a NW-SE oriented band of about 25 x 100 Km, with a predominant NW-SE transcurrent kinematic. Therefore the tectonic regime is supposed to be accommodated by NW-SE oriented strike-slip structures; however, no evidences support such assumption.
In order to better understand the tectonic of this area, we analyse the October/December 2008 events by means of DInSAR technique. Images from the C-band ERS and Envisat and from the L-band ALOS satellites are available, with different looking geometries and coverage: ascending and descending orbits, wide swath and fine beams, incidence angles from 23 to 41 degrees.
The time distribution of the images let us to discriminate the contribution of the October and December events, thus allowing a precise modelling of the seismic sequence. We define the source geometries with a non-linear inversion, followed by a linear inversion to retrieve the slip distribution. The latter is carried out with a new algorithm that allows to split the dislocation plane into patches of variable size, according to the model resolution matrix. We then analyse the static stress transfer with the Coulomb Failure Function, in order to understand the interaction of nearby faults and the tectonic implications for this sector of the Himalayan converging margin.