

Fault source modeling of the October 28, 2008 earthquake sequence in Baluchistan, Pakistan, using ALOS/PALSAR InSAR data

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The Quetta Syntaxis in the western Baluchistan, Pakistan, is formed as a result of oroclinal bend of the western mountain belt and serves as a junction for different faults. As this area also lies close to the left lateral strike slip Chaman fault, which is supposed to be marking the boundary between Indian and Eurasian plate, the resulting seismological behavior of this regime becomes even more complex. In the region of Quetta Syntaxis, close to the fold and thrust belt of Suleiman and Kirthar ranges and on 28 October 2008, there stroke an earthquake of magnitude 6.4 (Mw) which was followed by a doublet on the very next day. In association with these major events, there have been four more shocks, one foreshock and three aftershocks that have moment magnitude greater than 5. Here we use ALOS/PALSAR InSAR data sets from both ascending and descending orbits that allow us to more completely detect the deformation signals around the epicentral region. On the basis of these data sets, we propose a four-faults model that consists of two left lateral and two right lateral strike slips that also include some thrust slip. We have thus confirmed the complex surface deformation signals even from the moderate-sized earthquake. Intra-plate crustal bending and shortening seem to be often accommodated as conjugate faulting without any single preferred fault orientation. We also discuss two possible landslide areas along with the crustal deformation pattern.

Keywords: ALOS/PALSAR data, Earthquake, Crustal Deformation, Source Modeling, Conjugate Faulting