Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10044, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10044
EGU General Assembly 2008

Combination of space-borne radar imagery techniques to study the October 2005, Mw=7.6, Kashmir earthquake

E. Pathier (1), V. Pinel (2), P. Bascou (2), F. Jouanne (3), E. Fielding (4), T. Wright (5), B Parsons (6).

(1) LGIT, Université Joseph Fourier, France ; (2) LGIT, IRD/Université de Savoie, France ; (3) LGCA, Université de Savoie, France ; (4) Jet Propulsion Laboratory, California Institute of Technology, USA ; (5) School of Earth and Environment, University of Leeds, UK ; (6) Centre for Observation of Earthquakes and Tectonics, University of Oxford, UK

Measuring ground displacement from space-borne synthetic aperture radar (SAR) images can be achieved through two main techniques: sub-pixel images correlation and SAR interferometry (InSAR). We apply these techniques to study the October 2005, Mw=7.6, Kashmir Earthquake, using ENVISAT data from different tracks and view angles. Sub-pixel correlation data provided location of the fault trace within few hundred of meters. These data also allowed us to derive a three dimensional co-seismic displacement field with an accuracy of about 50 cm, over a 80x80km area centered on the fault trace (the East-West component being the less constrained). From these results, fault geometry and slip distribution are inverted using a model of rectangular dislocation in a homogeneous elastic half-space. The derived slip on the fault is shown to occur mainly in the ten first kilometers of the crust, and to be concentrated near the Muzzafarabad and Balakot cities. North of Balakot, slip is decreasing rapidly in correlation with a major geological boundary, suggesting a structural control on the rupture process. Less robust but more precise, InSAR data give more details in far field, but are not usable near the fault because of fringe aliasing due to high gradient displacements, and because of SAR images misregistration when forming interferograms. To mitigate these problems, we investigate how sub-pixel correlation result can improve unwrapping process and SAR images coregistration especially near the fault trace.

Combination of these complementary techniques at different processing steps looks promising to enhance the radar imagery capability to measure displacements caused by large earthquakes.