Geodetic monitoring in Nepal: preliminary results from Gorkha earthquake (25 April 2015)

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Poster
Abstract:
The Himalaya arc is one of the most complex and tectonically active areas in the world, a very long (2500km) plate boundary capable of catastrophic earthquakes up to 8 Mw (Rajendran and Rajendran, 2011). Segments of the complex fault system, that accomodate the deformation between Asia and India, lie in correspondence of densely populated cities (i.e. 7.8 Mw on 25 April 2015). A good monitoring system, composed of seismographs and a geodetic network, is the indispensable scientific base to assess and mitigate the risk in this area and to get a better understanding of the dynamics of those geodynamic processes. In this contribution we present the preliminary data and analysis from two GNSS stations located in Nepal, one near to the Everest Pyramid (EvK2CNR), the other one near to the Nagarkot city. Both the antennas seem to have sensed and measured the deformation due to the last catastrophic quake occurred on 25 April 2015. The GNSS time series in the Nagarkot station showed an abrupt change in the displacement, that could be the effect of the near field deformation associated to the quake. A forward model approach, using the Okada model (1985), has been used to verify the compatibility of the observed field to the modeled deformation. The other station that is farther from the fault seems to have recorded a transient deformation. We further analyze the noise level of the station and possible atmospheric induced signals.
Using the Okada model to simulate different displacement scenarios due to different earthquake parameters, we are able to assess the sensitivity of the network and efficiently program the installation of further stations.

Rajendran K., Rajendran C.P., 2011, Revisiting the earthquake sources in the Himalaya: Perspectives on past seismicity, Tectonophysics, 504, 75-88.
Okada Y., 1985, Surface deformation due to the shear and tensile faults in half-space, Bull. Seism. Soc. Am., 75, 1135-1154.
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