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Definition of the time-space propagation of ground deformation of the instable Eastern Flank of Mt.Etna between 2007 and 2010 from ALOS PALSAR InSAR data and comparison with CGPS data

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In this work we apply techniques of image processing to analyze 19 ALOS PALSAR images covering the time interval between 27 January 2007 and 07 may 2010 in order to analyze the time-space propagation of the ground deformation at the Eastern Flank of Mt. Etna. The proposed methodology compares one image to another, with the aim to find changes in the spatial location of deformation. This allows us to estimate the direction and the amplitude of the time-space propagation of ground deformation calculating a pre-defined distance between two Gaussian distributions.

The main result of this kind of analysis is the confirm that the instable Eastern Flank of Mt. Etna is undergoing to an effect of rotation. In particular our work shows an area of clockwise rotation which extends in the eastern flank, bounded approximately to the North by the North-East Rift and the Pernicana fault system, to the North-East by the Ripe della Naca fault scarps and to the East by the Timpe fault system. In correspondence with these structures the rotation reverses and becomes counter-clockwise. These effects of rotations are strongly controlled by the main tectonic features acting as real barriers to the propagation of the deformation. Finally we have compared these results with the analysis of the strain parameters calculated starting from the CGPS data of the 38-stations "Etna@net" network, covering the same time span of the ALOS data. This comparison has also confirmed the presence of a main rotation of the eastern flank and the difference of motion between different sectors of this instable flank.