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1994-1998 Differential InSAR data inversion at Mt Etna including the topographic correction in data analysis. A simple deformation source for a complex volcano structure ?

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1994-1998 D-InSAR data have been exploited to find out the deformation source localization at Mt. Etna.

SAR displacements assure a broad data coverage in volcanic area but the SAR image processing is affected by various problems, both in the interferogram formation and in the subsequent phase unwrapping. There are also problems due to the intrinsic geometric distortion of SAR images for steep slopes, abundant on Mt.Etna, and to the tropospheric effect, relevant because of a complex climatic condition for a volcano: only half of it is towards the sea.

We compared SAR data to the levelling network displacements to validate results from SAR elaboration. Theoretical vertical displacements are computed for different kind of sources to obtain the best source model to invert SAR displacements and to find out the deformation source localization. Particular attention has been devoted to the structural features of Etna volcano and to the south-east volcano flank spreading.

SAR displacements, before the inversion, have been corrected for the residual topographic effect. They have been computed on the ground deformation field through an interpolation of the existing data base of topographic correction at Mt.Etna, previously obtained for a set of superficial points and a grid of simulated deformation point-sources (Lungarini et al., 2005).