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The Trecastagni Fault dynamic by using continuous, discrete and satellite ground deformation measurements (Mt. Etna, Italy).

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The geodynamic framework of Mount Etna is characterized by a compressive stress regime, trending roughly N-S, due to the Eurasia-Africa plate collision, and an extensional regime trending roughly E-W.
The volcano edifice has formed at the intersection of two regional fault systems, having NNW-SSE and NE-SW trends respectively and the complex interaction between regional stress, gravity forces and dike-induced rifting, seem to have a role in the eastward movement of the Mt. Etna unstable eastern flank.
In this context the Pernicana Fault and the Trecastagni-Tremestieri Fault system seem to identify the northern and southern boundaries of the unstable sector.
The Trecastagni fault is a NNW-SSE tectonic structure that develops between Trecastagni and San Giovanni La Punta characterized by evident morphological scarps and movements of normal and right-lateral type that directly interest the SP 8/III° road and numerous buildings.
In order to investigate the ground deformation pattern associated to Trecastagni Fault dynamic, a multi-disciplinary approach is presented here.
During 2004-05 we started a monitoring of the fault installing two continuous wire extensimeters across the discontinuity in the northern and central sector of the fault.
A picture of the 2005-2009 measured displacements shows that Trecastagni fault is characterized by a continuous dynamics with a variable rate.
We related these data with information obtained using the Permanent Scatters (PS-InSAR) technique proposed by Ferretti et al., (2001) and that has allowed to define geometry and dynamic of the entire discontinuity.
Additional information will be available by a precise leveling network that has been carried out in November 2009 The network comprises 19 benchmarks distributed on a 7.5 Km long route that cross the Trecastagni Fault.

References

Ferretti, C. Prati, F. Rocca (2001), “Permanent Scatterers in SAR Interferometry”, IEEE TGARS, Vol. 39, no. 1.