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The exploitation of large archives of space-borne C-band SAR data in the framework of FP7-DORIS Project

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DORIS (Ground Deformations Risk Scenarios: an Advanced Assessment Service) is an advanced downstream service project within the seventh Framework Programme of the European Commission. A European team was set up in order to make the best views of the most advanced research and technologies outcomes in the field of Earth Observation (EO) for the improvement of risk management. The aim of the DORIS project is the development of new methodologies for the detection, mapping, monitoring and forecasting of ground deformations.
DORIS integrates traditional and innovative EO and ground based (non-EO) data to improve our understanding of the complex phenomena at different temporal and spatial scales and in various physiographic and environmental settings that result in ground deformations, including landslides and ground subsidence, for civil protection purposes.
One of the goal of the Doris Project is the exploitation of the large data archives for geohazards mapping. In this work the existing ESA Synthetic Aperture Radar (SAR) archives, operating in the microwave C-band (data collected by the ERS-1/2 and ENVISAT satellite) were analysed through new algorithms developed to reconstruct long time series (almost 20 years) and the obtained preliminary results are presented. The algorithms are based on Small BAseline Subset technique (SBAS; developed by CNR-IREA), ERS- ENVISAT Stitching (T.R.E.), Stable Point Network (SPN; Altamira) and ERS-ENVISAT Interferometric Point Target Analysis (IPTA; Gamma).
The potentiality of these algorithms were evaluate in selected test sites characterized by different ground deformation phenomena (landslide and/or subsidence): i) Central Umbria (Italy); ii) Messina Province (Italy); iii) Rácalmás (Hungary); iv) Silesian Coal Basin (Poland); v) Tramuntana Range (Mallorca, Spain) and vi) St. Moritz (Switzerland).
The results demonstrate the usefulness of the implemented algorithms, but in some cases there is a loss of the coherent points, especially in the most unstable areas.