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Detection and Interpretation of Ground Motion Areas with the A-DInSAR Time Series Analysis: Application to Different Engineering Geological Problems

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Recent advanced ground deformation investigations make use of satellite Synthetic-Aperture Radar (SAR) data, a remote sensing tool, to examine the mechanisms of ground motion around the world. In the last two decades, Advanced Differential Synthetic-Aperture Radar (A-DInSAR) techniques have experienced a major development, which is mainly related to (i) the progress of the SAR data acquired by the COSMO-SkyMed satellites and the recent ESA Sentinel missions, that act at higher spatio-temporal resolution, and to (ii) the development of advanced processing algorithms. The improvements in the A-DInSAR technique need of an appropriate methodology to analyse extremely large datasets which consist of huge amounts of measuring points with high temporal resolution. This work contributes to address to these problems by exploiting the great potential contained in the A-DInSAR time series. A novel methodology was implemented in order to for the geological interpretation of Ground Motion Areas (GMA) and to distinguish different components of ground motion. This work is aimed also to present the contribution of data and information coming from A-DInSAR to different problems of the engineering geology: land subsidence due to groundwater exploitation, effects of swelling-shrinkage of clayey soils, estimation of hydrogeological parameters. Then, the work gives insight into the applicability of A-DInSAR to interesting case histories for the ground motion identification, monitoring and modelling.

Biography:

Claudia Meisina received her PhD in Earth Sciences from the University of Pavia (Italy). Currently is associate professor in Engineering Geology at the Department of Earth and Environmental Sciences of University of Pavia, where she leads the Laboratory of Engineering Geology. She has been a post-doc at the BRGM in France. She is actually involved in Liquefact Horizon 2020 Project. Research interests concern methodologies for the geological interpretation of satellite radar interferometric data for landslide and subsidence identification and monitoring and the role of land use in shallow landslide triggering. She published 60+ peer-reviewed papers in the field of engineering geology.