Advanced differential interferometry and geological data: integration of subsoil architecture, surface morphology, climate data and anthropic factors to detect deformation patterns in alluvial plains affected by subsidence

(Proposer: Prof. Mario Floris)

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The main aim of the research is to compare satellite and ground - based data in order to evaluate the influence of anthropic pressure in areas naturally prone to subsidence. Ground deformations due to subsidence are often caused by anthropic and natural factors which work at different spatial and temporal scales, such as recent sediments consolidation, tectonic processes, hydrocarbons and water exploitation, and structure and infrastructure development. An innovative aspect of the research regards the quantitative estimation of each related factors by implementing a geotechnical model of the subsurface and combining in situ data with SAR images processed by different advanced techniques (SBAS and PS). Moreover, the current availability of very high-resolution SAR data from COSMO SKY -MED missions will allow working at very detailed scale.

During the research the following tasks will be performed:

-geological and geomorphological surveys;

-processing of satellite SAR data and validation by ground

- based surveys(GPS);

-evaluation of horizontal and vertical components of displacements;

-quantitative analysis of subsidence rate and delimitation of most affected areas;

-classification of displacement time series;

-identification of displacement trends;

-interpretation of conditioning and triggering factors;

-development of a geotechnical model which will allow to quantify anthropic and natural related factors.

The research will be carried out with the collaboration of experts from University of Padua (Geosciences, DICEA), Research Institute for Geo-Hydrological Protection-Italian National Research Council (CNR-IRPI Padova), University of Pavia and SARmap sa (Switzerland).

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