EUROPEAN GROUND MOTION SERVICE (EGMS): FROM INSAR PROCESSING TO PRODUCT DISSEMINATION

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Abstract

Synthetic aperture radar (SAR) interferometry (InSAR) is a powerful technology that makes it possible to measure, with millimeter-scale precision, ground motions (typically induced by landslides, subsidence and earthquake or volcanic phenomena) using series of SAR data acquired from satellite. This enables, for example, monitoring of the stability of slopes, mining areas, buildings and infrastructures.

Satellite InSAR technology is at the basis of the European Ground Motion Service (EGMS), which is funded by the European Commission and forms an essential element of the Copernicus Land Monitoring Service (CLMS) managed by the European Environment Agency. The EGMS constitutes the first application of the InSAR technology to high-resolution monitoring of ground deformations over an entire continent, based on full-resolution processing of the whole archive of past and future Sentinel-1 (S1) satellite acquisitions over most parts of Europe.

Upscaling from existing national precursor services to pan-European scale is a very challenging but important task, although low-resolution datasets have been recently produced at this scale. To this aim, the EGMS counts on leading expertise on InSAR technology and ground motion service provision, and utilises the most advanced persistent scatterer (PS) and distributed scatterer (DS) InSAR processing algorithms, as well as adequate techniques exploiting the overlaps between adjacent processing areas in order to ensure seamless harmonization between the adjacent S-1 tracks. Moreover, the realization of a high-quality GNSS model and its use, to tie the ground motion products to an established geodetic reference frame (ETRF2014), is also foreseen within EGMS.

To foster maximum use of the service by the growing Copernicus user community and the public at large, the EGMS will also realize provide tools for visualization, exploration, analysis and download of the ground deformation measurements, as well as elements to promote best practices and user uptake. The EGMS will add a new and unique European-wide geospatial layer to the Copernicus Land Monitoring Service (CLMS) portfolio.