

Internship proposal

Underground Gas Storage (UGS) reservoir monitoring based on Synthetic Aperture Radar (SAR) image time series interferometric processing.

Description:

The exploitations of the coal mines in Wallonia (Belgium) were ceased progressively till the year 1984. Some of these mines are now used as strategic Underground Gas Storage to regulate gas supply. Due to the highly urbanized areas above those sites, there is an evident need for monitoring spatially and temporally the low amplitude of deformation associated with the gas storage and extraction activities in deep geological layers.

Studies based on Persistent Scatterers SAR Interferometry (PSInSAR) technology have demonstrated the effectiveness in detecting and monitoring land surface deformations linked to mining operations.

On its side, Centre Spatial de Liège (CSL) has a long and renown experience in SAR interferometry (InSAR). In collaboration with the European Centre of Geology and Seismology (ECGS), Luxemburg, CSL developed a toolbox named AMSTer (InSAR **A**utomated **M**ass processing **S**oftware for multidimensional SAR **T**ime **s**eries). This latter one allows performing ground displacement monitoring using the so called Multidimensional Small Baseline Subset (MSBAS) in place of using PSInSAR.

Objectives of the internship will be:

- Understand SAR, InSAR and MSBAS techniques,
- Build SAR image time series using COPENICUS Sentinel1 data,
- Implement and use the MASTer toolbox to perform time series processing,
- Issue up-to-date ground motion maps of Wallonia UGS sites,
- Validate / compare results with existing PSInSAR studies for concurrent periods,
- Report and publish study results.

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