



Geodetic integration of Sentinel-1A IW data using PSInSAR in Hungary

Péter Farkas (1), Renáta Hevér (1), Gyula Grenczy (1,2)

(1) Satellite Geodetic Observatory, FÖMI, Hungary, (2) Geodetic and Geophysical Institute, RCAES, Hungarian Academy of Sciences, Hungary

ESA's latest Synthetic Aperture Radar (SAR) mission Sentinel-1 is a huge step forward in SAR interferometry. With its default acquisition mode called the Interferometric Wide Swath Mode (IW) areas through all scales can be mapped with an excellent return time of 12 days (while only the Sentinel-1A is in orbit). Its operational data policy is also a novelty, it allows scientific users free and unlimited access to data.

It implements a new type of ScanSAR mode called Terrain Observation with Progressive Scan (TOPS) SAR. It has the same resolution as ScanSAR but with better signal-to-noise ratio distribution. The bigger coverage is achieved by rotation of the antenna in the azimuth direction, therefore it requires very precise co-registration because even errors under a pixel accuracy can introduce azimuth phase variations caused by differences in Doppler-centroids.

In our work we will summarize the benefits and the drawbacks of the IW mode. We would like to implement the processing chain of GAMMA Remote Sensing of such data for mapping surface motion with special attention to the co-registration step. Not only traditional InSAR but the advanced method of Persistent Scatterer InSAR (PSInSAR) will be performed and presented as well. PS coverage, along with coherence, is expected to be good due to the small perpendicular and temporal baselines.

We would also like to integrate these measurements into national geodetic networks using common reference points. We have installed trihedral corner reflectors at some selected sites to aid precise collocation. Thus, we aim to demonstrate that Sentinel-1 can be effectively used for surface movement detection and monitoring and it can also provide valuable information for the improvement of our networks.