Geophysical Research Abstracts
Vol. 18, EGU2016-14756, 2016
EGU General Assembly 2016

Sentinel-1 automatic processing chain for volcanic and seismic areas monitoring within the Geohazards Exploitation Platform (GEP)

Claudio De Luca (1,2), Ivana Zinno (1), Michele Manunta (1), Riccardo Lanari (1), and Francesco Casu (1)
(1) IREA - CNR, Naples, Italy (deluca.c@irea.cnr.it), (2) DIETI, UNINA, Naples, Italy

The microwave remote sensing scenario is rapidly evolving through development of new sensor technology for Earth Observation (EO). In particular, Sentinel-1A (S1A) is the first of a sensors' constellation designed to provide a satellite data stream for the Copernicus European program. Sentinel-1A has been specifically designed to provide, over land, Differential Interferometric Synthetic Aperture Radar (DInSAR) products to analyze and investigate Earth's surface displacements.
S1A peculiarities include wide ground coverage (250 km of swath), C-band operational frequency and short revisit time (that will reduce from 12 to 6 days when the twin system Sentinel-1B will be placed in orbit during 2016). Such characteristics, together with the global coverage acquisition policy, make the Sentinel-1 constellation to be extremely suitable for volcanic and seismic areas studying and monitoring worldwide, thus allowing the generation of both ground displacement information with increasing rapidity and new geological understanding.
The main acquisition mode over land is the so called Interferometric Wide Swath (IWS) that is based on the Terrain Observation by Progressive Scans (TOPS) technique and that guarantees the mentioned S1A large coverage characteristics at expense of a not trivial interferometric processing. Moreover, the satellite spatial coverage and the reduced revisit time will lead to an exponential increase of the data archives that, after the launch of Sentine-1B, will reach about 3TB per day.
Therefore, the EO scientific community needs from the one hand automated and effective DInSAR tools able to address the S1A processing complexity, and from the other hand the computing and storage capacities to face out the expected large amount of data. Then, it is becoming more crucial to move processors and tools close to the satellite archives, being not efficient anymore the approach of downloading and processing data with in-house computing facilities.
To address these issues, ESA recently funded the development of the Geohazards Exploitation Platform (GEP), a project aimed at putting together data, processing tools and results to make them accessible to the EO scientific community, with particular emphasis to the Geohazard Supersites & Natural Laboratories and the CEOS Seismic Hazards and Volcanoes Pilots.
In this work we present the integration of the parallel version of a well-known DInSAR algorithm referred to as Small BAseline Subset (P-SBAS) within the GEP platform for processing Sentinel-1 data. The integration allowed us to set up an operational on-demand web tool, open to every user, aimed at automatically processing S1A data for the generation of SBAS displacement time-series. Main characteristics as well as a number of experimental results obtained by using the implemented web tool will be also shown.
This work is partially supported by: the RITMARE project of Italian MIUR, the DPC-CNR agreement and the ESA GEP project.