

Short course on "SAR and Interferometric processing for land applications"

The course shall bring to the participants both theoretical and practical aspects related to the SAR and InSAR processing, with special focus and target on land applications. The course will have a theoretical part, where fundamental concepts are presented and discussed in view of different applications, and a practical part, where the course participants will have the possibility of testing the presented concepts on real SAR data and on real test cases. The course will conclude with a section where the integration of SAR, InSAR and optical data is discussed, with particular emphasis on the complementary information brought by SAR data respect to optical sensors. The practical exercises will mainly focus on African test sites, using SAR data from different sensors like ERS-1/2, ENVISAT ASAR, ALOS PALSAR, TerraSAR-X, Cosmo-Skymed and airborne SAR sensors as well as optical satellite data. The practical part of the course will exploit the ENVI+SARscape COTS SAR & Image Processing packages.

The course outline is the following:

1. SAR system, Focusing, Speckle, Geometry & Radiometry, Classification
 - Focus on multi-temporal data processing and analysis;
 - Exercise from raw to sigma0 data
 - Exercises on features extraction and classification
 - Applications: forestry, agriculture, and change detection in general (flooding, burnt areas, etc.)Duration: 2 days

2. SAR Interferometry, Principles, DEM generation, Differential Interferometry, Persistent Scatterers, SBAS, Wide-Swath Interferometry
 - Exercise from SLC pair to DEM
 - Exercises from SLC pairs to Land displacements using DInSAR, WS-InSAR and SBAS / PS
 - Applications: DEM generation and cartography, geology, land and objects displacement, landslides and earthquakes monitoring.Duration: 2 days

3. Polarimetry and PolInSAR, Principles and classification
 - Exercise based on ALOS PALSAR data
 - Exercise based on airborne data
 - Applications: forestry, agriculture.Duration: 0.5 day

4. SAR, InSAR and optical data fusion
 - Exercise based on ENVISAT ASAR, ALOS PALSAR, Landsat and SPOT data
 - Applications: forestry, agriculture, food security.Duration: 0.5 day

Course material, like presentations and test data, will be distributed to the audience. The participants will receive a time-limited licence of the two software packages to consolidate what learned during the course.