



Geomatics Update Program

GROUND-BASED SAR FOR DEFORMATION MONITORING: DATA ANALYSIS

Course details:

Tuesday – Thursday
25 – 27 June 2019
From 9:00 to 17:30

Venue:

Centre Tecnològic de
Telecomunicacions de Catalunya
(CTTC)
Av. Carl Friedrich Gauss, 7
Parc Mediterrani de la Tecnologia
E-08860 Castelldefels (Barcelona)
Spain

Language of the course:

English

Lecturers:

Michele Crosetto, CTTC
Guido Luzi, CTTC
Oriol Monserrat, CTTC

More information:

<http://gbsar-course.cttc.es>

Contact:

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On-line registration:

<http://gbsar-course.cttc.es/registration-form.html>

Course fees (3-day course):

525 € (VAT included)

Organized by:



Sponsored by:



Edition:

8th EDITION

Course overview

Ground-based Synthetic Aperture Radar (GBSAR) is a powerful terrestrial radar-based technique able to measure and monitor surface deformation. The GBSAR has been used in the last years in a variety of application fields including the monitoring of landslides, rock falls, subsidence phenomena, mining sites, etc. The increasing interest in this technique has led a wide range of technicians, young researchers, scientists and managers from different disciplines to process and analyse this innovative kind of data. The course is addressed to all of them, covering the relevant aspects of GBSAR data analysis to understand advantages and limitations of this new technique and to correctly exploit and interpret its data. The main components of the GBSAR chain, including the design of the campaign, data acquisition, screening, processing, analysis, geocoding and visualization, will be discussed during the course. An introduction to the fundamentals of terrestrial SAR and deformation measurement by SAR interferometry will be provided, followed by an in-depth discussion of different types of deformation monitoring approaches, emphasizing the practical aspects and analyzing different types of deformation phenomena and monitoring scenarios. Lectures will be complemented by hands-on sessions where practical exercises, using actual GBSAR data and the experimental in-house developed software of the Geomatics Division of CTTC, will be carried out.

Audience

Technicians, young researchers and scientists interested in both the GBSAR technique and terrestrial deformation monitoring. Given the versatility of the addressed technique and the wide range of potential applications, the course has been designed so the participants do not require any specific knowledge. Previous experience with any GBSAR system or GBSAR data will surely be beneficial, even though it is not necessary to attend the course.

Course material

Copies of the presentations and other materials presented during the course.

Modules

- Ground-based SAR: the system, working principles and main applications.
- SAR interferometry for deformation measurement and DEM generation: main principles, and technical issues, e.g. coherence, corner reflectors, phase unwrapping and aliasing, atmospheric component, etc. Practical exercises.
- Deformation measurement using GBSAR: sensor geometry, selection of the point-of-view, line-of-sight measurement, reference point, etc.
- Continuous GBSAR monitoring: basics, main advantages and limitations, discussion of the entire GBSAR data processing and analysis chain. Practical exercises.
- Discontinuous GBSAR monitoring: principles, advantages and disadvantages, data analysis strategies. Practical exercises.
- Data quality, measurement performances, error analysis and GBSAR validation.
- Data analysis using not interferometric techniques: overview, processing strategies and discussion of examples. Practical exercises.

Lecturers

The lectures will be delivered by experts of the Remote Sensing Department of the CTTC, which possesses more than a decade of research experience with GB-SAR and satellite SAR Interferometry and Persistent Scatterers Interferometry techniques. The GBSAR activities were initiated during the 6FWP Galahad project, "Advanced Remote Monitoring Techniques for Glaciers, Avalanches and Landslides Hazard Mitigation". Since then, a number of research projects with C-, S- and Ku-band GBSAR data have been carried out. The CTTC owns the GB-SAR system IBIS-L manufactured by IDS since 2008. The CTTC research activities in the field of GBSAR focus on three main lines: (i) development of new algorithms for data processing and analysis; (ii) validation activities and comparison and integration with other techniques, such as satellite-based SAR or terrestrial laser scanner data; (iii) development of novel GB-SAR applications. More information on the above research activities can be found here: <http://geomatics.cttc.es/>.

Geomatics update

This course forms part of the Geomatics Update framework. Geomatics Update is focused on the latest research achievements and technological development in Geomatics and related disciplines. Watch out for future Geomatics Update activities in the CTTC website.