MULTI-THEMATIC EXPLOITATION OF TERRASAR-X IMAGES IN THE CONTEXT OF THE KALIDEOS REFERENCE DATASETS

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Abstract

The **Kalideos reference datasets** (http://kalideos.cnes.fr), initiated in 2002, aim at providing the scientific community with time series of multi-sensors (optical and radar) and multi-resolution remote sensing imagery.

Up to now, three reference datasets have been developed over multi-thematic sites: Fundulea, Romania; the Reunion island, France; and the Arcachon basin, France. Each dataset has been used for a wide range of thematic applications: crop modelling; decision making aid in agriculture, land use mapping; volcano monitoring, river torrential dynamics or shoreline monitoring among others. One of the main characteristics of the Kalideos databases is that they include satellite images accurately geometrically and radiometrically processed by CNES in order to provide temporally consistent datasets.

TerraSAR-X data have been tasked over two of the sites for several topics for which high resolution SAR imagery is proven to be very useful:

- **Sugarcane crop monitoring** on the Reunion Island: the sensitivity of different SAR parameters, including incidence angles (large and low angles) and distinct polarization combination, to sugarcane growth stages will be analysed to determine the optimum configuration for the best characterisation of sugarcane fields and monitoring of sugarcane harvest. Correlation between information derived from SAR and optical imagery will also be evaluated as a function of sugarcane crop parameters in order to develop optical/radar synergy for crop monitoring.
- **Volcano monitoring** on the Reunion island: though the interest of interferometric SAR to follow volcanic activity has already been widely demonstrated, operational monitoring requires the use of all the available sensors, more particularly during crisis periods. The capability of TerraSAR-X to perform such a monitoring in conjunction with other SAR systems will therefore be analysed using several orbital configurations.
- **Forest monitoring** over the Arcachon site: low incidence SAR imagery has already proven to be useful to characterise pine forest texture and improve forest biomass monitoring. As a new source of data, TerraSAR-X will be studied with respect to these points compared to other sources of information available on the site.

These three studies will serve as typical examples of multi-thematic use of TerraSAR-X imagery and demonstrate the relevance of TerraSAR-X imagery for scientific reference datasets.