First Results of the Performance of the Global Forest/Non-Forest Map derived from TanDEM-X Interferometric Data

Carolina Gonzalez, Paola Rizzoli, Michele Martone, Christopher Wecklich, Jose Luis Bueso Bello, Gerhard Krieger, and Manfred Zink

Microwaves and Radar Institute, German Aerospace Center, Germany (carolina.gonzalez@dlr.de)

The globally acquired interferometric synthetic aperture radar (SAR) data set, used for the recently completed primary goal of the TanDEM-X mission, enables a big opportunity for scientific geo-applications. Of great importance for land characterization, classification, and monitoring is that the data set is globally acquired without gaps and includes multiple acquisitions of every region, with comparable parameters. One of the most valuable maps that can be derived from interferometric SAR data for land classification describes the presence/absence of vegetation. In particular, here we report about the deployment of the Global Forest/Non-Forest Map, derived from TanDEM-X interferometric SAR quick-look data, at a ground resolution of 50 m by 50 m.

Presence of structures and in particular vegetation produces multiple scattering known as volume decorrelation. Its contribution can be directly estimated from the assessment of coherence loss in the interferometric bistatic pair, by compensating for all other decorrelation sources, such as poor signal-to-noise ratio or quantization noise. Three different forest types have been characterized based on the estimated volume decorrelation: tropical, temperate, and boreal forest. This characterization was then used in a fuzzy clustering approach for the discrimination of vegetated areas on a global scale.

Water and cities are filtered out from the generated maps in order to distinguish volume decorrelation from other decorrelation sources.

The validation and performance comparison of the delivered product is also presented, and represents a fundamental tool for optimizing the whole algorithm at all different stages.

Furthermore, as the time interval of the acquisitions is almost 4 years, change detection can be performed as well and examples of deforestation are also going to be included in the final paper.