

## 4. TanDEM-X Science Team Meeting, 12 - 14 June 2013, DLR Oberpfaffenhofen

### Height map generation for hydrology from low incidence TanDEM-X data

*Pourthie, Nadine - CNES, DCT/SI/AR*

*Desroches, Damien - CNES, Altimetry and Radar (DCT/SI/AR)*

*Fjortoft, Roger - CNES, Altimetry and Radar*

*Duro, Javier - ALTAMIRA-INFORMATION, N/A*

*Ordoqui, Patrick - ALTAMIRA-INFORMATION, N/A*

TanDEM-X has primarily been designed to produce a very detailed DEM of the Earth's land surfaces, but its unique acquisition capacities open for a variety of other applications within several scientific domains, including hydrology. The main objective of the XTI\_HYDR0388 study is to assess the possibility of measuring water surface heights and related parameters through simultaneous cross-track interferometry, using TanDEM-X data. Since 2011, several acquisitions with a relatively low incidence angles (20-30°), in ascending and descending path directions, have been acquired to maximize the backscattering from water. The test zone is the Camargue area in Southern France (Rhône delta), for which a very detailed reference DEM for the land surfaces (IGN BDT Rhône) and frequent gauge measurements exist. The DIAPASON software of CNES, after some adaptations made by Altamira-Information, is used for the interferometric processing and transformation into height maps. The first goal of the current study is to evaluate the quality of the phase information and attainable height precision over land surfaces, based on the interferograms computed from the delivered TanDEM-X Co-SSC image pairs, compared to a very accurate DEM (2 m resolution, height accuracy of 20 cm). The second purpose of the study is to evaluate the mean water surface heights with respect to the land surfaces (or an absolute reference) based on the computed TanDEM-X interferograms. The impact of varying conditions in terms of surface roughness (mainly due to varying wind speed for continental water surfaces) will be evaluated by comparing the various bistatic image pairs acquired on different dates. The decorrelation due to water movement during the integration time (0.5 s) will be assessed (e.g. comparing rivers with small lakes), and possible differences between bi- and monostatic acquisitions in terms of temporal coherence will be examined. The added value of TanDEM-X data in the context of hydrology studies will be commented on.