



Performance of FDRALT Inland Water Thematic Data Products over Rivers

Stefania Camici¹, Angelica Tarpanelli¹, and Beatriz Calmettes²

¹National Research Council, Research Institute for Geohydrological Protection, Perugia, Italy (s.camici@irpi.cnr.it)

²Collecte Localisation Satellites (CLS), 31520 Ramonville Saint Agne, France

Floods and droughts are widespread natural hazards that cause a huge amount of damages with economic and consequent life losses every year worldwide. Among the best practices for risk reduction and mitigation there are the early warnings and forecast systems that require a robust meteo-hydro monitoring system to efficiently work.

Satellite radar altimetry, at the beginning designed to provide highly accurate measurements of sea surface heights over open ocean areas, has been demonstrated to be a key technique for inland water monitoring. In contrast to open ocean altimeter measurements, reflected radar echoes from other surface types (e.g., floodplains, rivers, reservoirs) show different shapes depending on the reflectors within the altimeter footprint. A careful data editing and reprocessing is required in order to derive reliable and highly accurate range measurements from the received waveforms—a process called retracking. Within the last decade, various investigations on new retracking algorithms have been made in order to enhance the accuracy of coastal and inland water level estimation.

Fundamental Data Records for Altimetry (FDR4ALT) is an ESA project aiming at generating innovative Earth system data records and thematic records (Level 2 products) from the measurements of ERS1, ERS2 and Envisat missions by applying different retrackers for different surface types (inland water, oceans, sea-ice, land-ice). In particular, the Inland Water Thematic Data Product (TDP) addresses the need to bring the altimetry and hydrology thematic together to strengthen the space hydrology thematic.

In this work, we presented the analysis of the TDP generated with Envisat mission. The inland water TDP was compared to in-situ water level measurements recorded from multiple stations over different basins, mainly Po, Amazon and Godavari rivers. The performance was evaluated in terms of relative Root Mean Square Error (rRMSE), coefficient of correlation (R) and Nash-Sutcliffe (NS) between the level 3 TDP and the in-situ water level observations. Results show that FDR4ALT TDP water level is quite accurate in reproducing observed time series especially over the Po river where there is a high confidence on in situ observations.