A Robust Error Characterization Method for SAR Altimetry over the Inland Water Domain

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The advent of SAR (delay-Doppler) altimetry allowed the production of data with a high spatial resolution (300 m along-track). Investigations in the inland water domain clearly benefited from SAR data and future processing strategies (e.g. the fully-focused SAR, FF-SAR) are expected to improve further the quantity of data points over water bodies of a reduced size.

The proposed work aims at investigating the quality of Sentinel-3 water level retrievals over three targets of different characteristics: the Ohio River, the Columbia River and the Great Salt Lake. Data are processed through the ESA G-POD SARvatore online and on-demand processing service for the exploitation of CryoSat-2 and Sentinel-3 data (https://gpod.eo.esa.int/services/SENTINEL3_SAR/) and obtained by using the SAMOSA2, SAMOSA+ & SAMOSA++ retrackers. The selected posting rate of measurements is 80 Hz to optimize the location of data points over the Ohio and Columbia River (an estimate every 80 m along-track), however a comparison with the 20 Hz posting rate is being made. Empirical retrackers outputs, available in the official 20 Hz Sentinel-3 LAN products, are also considered for comparison and water masks from (Pekel et al., 2016) are used to select data points acquired over water bodies.

The main goal of this study is to analyse the key parameters characterizing both the L1b SAR waveform and the retracking (e.g. the Pulse Peakiness, the Misfit...) to define a robust error characterization method that is expected to filter out an increased number of outliers. A validation exercise using in situ data will be presented to demonstrate that the proposed method leads to the definition of a reduced, highly reliable dataset, associated with a realistic error characterization model.

The study is expected to unlock possible synergies with SWOT and support the comparison of SAR estimates to FF-SAR estimates obtained at a comparable along-track resolution.
