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Evaluation of Sentinel-3A SAR Altimetry Observations over the Taiwan coastal region

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Pulse-limited radar altimeters have been proven to be an excellent data source in oceanography for monitoring sea surface heights and inland water surface elevations since the 1990s. However, the measurements of conventional altimetry missions in coastal areas present the principal problems related to the inherent limitations of this technique such as wider footprint resulting in contaminated waveforms and relatively unreliable media and geophysical corrections. The European Space Agency (ESA) and the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) joint mission Sentinel-3A, launched in February 2016, is the first altimetry mission to provide 100% global coverage of ocean observations in Synthetic Aperture Radar (SAR) mode. The Sentinel-3A carries a dual-frequency (Ku- and C-band) Synthetic Aperture Radar Altimeter (SRAL) with a new on-board tracking system (open-loop tracking mode) to employ SAR altimetry technologies providing finer along-track spatial resolution up to ~300 m. Compared with the similar mission Cryosat-2, Sentinel-3A has a better ability to observe the global monitoring of ocean dynamics with a shorter repeat cycle of 27 days and less affected by topography in contaminated waveforms from coastal regions due to open-loop tracking mode with a good prior surface elevation estimate on-board. In this study, the SAR altimetry observations of Sentinel-3A over the Taiwan coastal region were reprocessed by a proposed retracking strategy to obtain more accurately retrieved sea level observations. The main objective of this study is to evaluate the performance of Sentinel-3A in coastal observation by using a near-by tide gauge measurements or other altimetry mission like SARAL/Altika and Jason-3.