

Gravity Recovery From Satellite Altimetry

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Abstract

With the advancements of satellite altimeter technology and data volume, the spatial resolution and accuracy of altimeter-derived marine gravity anomalies have been improved steadily in the past four decades. Sea surface heights (SSHs) from all types of altimeters, ranging from pulse-limited radar, laser to scanning SAR, can be converted to gravity anomalies in the oceans. Ideally, a best marine gravity field is obtained by fusing all existing altimeter data by considering the spatial resolutions and accuracies of the individual satellite altimeters, with outliers removed and weights calibrated. The SWOT altimeter mission will be launched on December 5, 2022, providing SSHs on a 120 km by 120 km frame with ~500 m spatial resolution. Such altimeter data pose a significant challenge on the techniques for gravity derivation, but provide unprecedented opportunities to refine marine gravity anomalies to advance marine geophysics, coastal geoid modeling and depth datum modeling. This presentation will use the numerical examples in the South China Sea to highlight the importance of altimeter data fusion and calibration, and present the results from different techniques of gravity derivation.

Keywords: *Satellite Altimetry, SWOT, Gravity recovery, Coastal sea level, Marine gravity field*