



Feasibility Study of Density Contrast Estimation for Bathymetry Prediction

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Sparse multi-beam echo sounding measurements and dense satellite-derived gravity anomalies are combined to estimate depth in the ocean. Short wavelength gravity effect estimated from simple Bouguer slab approximation stabilized bathymetry prediction using tuning density contrast determined in the gravity-geologic method (GGM). The density contrast between seawater and ocean bottom bedrock in the GGM is a key factor in accurate bathymetry prediction in deep sea. In this study, satellite altimetry-derived gravity anomalies were used to determine the density contrast in various depths of the seabed, such as the East Sea of Korea, around the Arctic Ocean and the Antarctic Ocean, the Japan Trench, and the Peru-Chile Trench. Predicted bathymetry in various depth conditions between 1,000 m and 8,000 m was compared with shipborne depth measurements to validate the accuracy. Finally, we estimated the optimal density contrast for subsea depth in various depth conditions by linear regression analysis.

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