

Bathymetry Estimation of shallow water Using multi-temporal satellite images

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Abstract: Bathymetry estimation is an important issue but also a challenge problem. There are two main approaches for bathymetry measurement, echo sounder and optical satellite images. Echo sounder can measure the bathymetry thousands of meters with a narrow band along the track. Therefore, it is difficult to estimate the bathymetry in a wide area. On the other hand, optical satellite image can survey a large area but the penetration is less than 20 meters. In this study, we adopt a simple method for estimating water depths from multi-temporal Formosat-2 data for shallow bathymetry. After the correction of sun-glint effects, with the tidal level difference of the acquired satellite images and estimated attenuation coefficient and bottom reflectance, the water depth can be derived. Formosat-2 image scenes near East-Northern Taiwan are used for experiment. The performance evaluation is conducted by comparing the result with depth data from echo sounder sonar surveying.

Key words: bathymetry, attenuation coefficient, bottom reflectance, sun-glint, Formosat-2