Study the Bottom Topography in Taiwan Tan

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Abstract

Under favorable wind condition with strong tidal current, the surface signature of bottom topography in shallow water area have been observed in the Synthetic Aperture Radar (SAR) images. Taiwan Tan is located at southwest of Taiwan in the Taiwan strait. The typical water depth there is around 30 m to 10 m in the shallowest area. An area (about 100 km x 100 km) of extensive sand wave field has been developed regularly by wind, current, and waves. This area is an ideal location and has been selected to study the bottom topography using SAR images. Several ERS-1/2 SAR images with clear bottom topography on the Taiwan Tan collected under favorable weather condition with strong tidal current will be presented. In these images, the surface signatures reveal a lot of details on sand wave pattern, which have not been shown on the ship navigation maps. According to the survey carried out by the Taiwan Research Ship No. 3, the height of sand waves ranges from 3 m to 20 m, and wavelength ranges from 300 m to 1000 m. The bottom topography along the ship route has been simulated by numerical model based on the backscattering intensity in the SAR images. A parametric study and the comparison of simulated bathymetry with measurements have been performed. Routine survey of bottom topography has been developed by overlaying several SAR images collected at different time (multitemporal), using wavelet analysis of SAR images for line feature extraction (detection) and wave pattern tracking (monitoring).

Keywords: bottom topography, sand waves, ERS SAR, Taiwan Tan