

Internal Wave Study in the South China Sea Using SAR

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Synthetic Aperture Radar (SAR) images have been used to study the characteristics of internal waves in the South China Sea. Most of internal waves in the north part of South China Sea are propagating westward and are generated from the shallow topography or sills in the Luzon Strait. Huge internal solitons were observed near DongSha Island with crest more than 200 km long in RADARSAT and ENVISAT ASAR images. One of the most interesting processes is the detection of elevation internal waves in shallow water and depression waves on the shelf break in the same SAR imagery. The effects of water depth on the evolution of solitons and wave packets have been modeled by modified KdV-type equation and linked to the satellite image observations. For a case of depression waves in deep water, the solitons first disintegrate into dispersive wave trains and then evolve to a packet of elevation waves in the shallow water area, after they pass through a "critical depth" of approximately equal thickness of mixed layer and bottom layer as demonstrated by the numerical model. Near DongSha Island, the westward propagating huge internal solitons are often encountered and broken by the coral reefs on the shelf and re-merged after passing the island. In the shallow water area, significant sediment re-suspension due to the current induced by the elevation internal waves has also been observed.