

Internal Wave Study in The South China Sea Using SAR

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Internal wave distribution maps have been compiled from more than one hundred of ERS-1/2, RADARSAT and Space Shuttle SAR images in the South China Sea (SCS) since 1993. Based on these distribution maps, most of internal waves in the northeast part of SCS were propagating westward generated from the Luzon Strait. The wave crest can be as long as 200 km with amplitude of 100 m, due to strong current from the Kuroshio branching out into the SCS. In the South China Sea internal wave study of ASIAEX (Asia Seas International Acoustics Experiment), moorings have been deployed in April/May 1999, 2000, and 2001. The moorings consisted of a chain of thermistors and ADCP. Simultaneous Synthetic Aperture Radar (SAR) data from ERS-2 and RADARSAT satellites have been collected. The high-resolution SAR images collected from the Taiwan ground station were processed in near real-time to coordinate the field test and then used to compare with mooring data. SAR data and ADCP data show internal solitary waves induced by the semi-diurnal tides with a wave speed up to 2 m/s. The maximum current induced by internal waves in the mixed layer is about 2 m/s in the west direction, and is more than 1 m/s in the east direction in the bottom layer. Also, both SAR and mooring data in shallow water (100 m depth) show the existence of the elevation waves. Environmental parameters have been calculated based on extensive CTD casts data near the ASIAEX area. Nonlinear internal wave models have been applied to integrate and assimilate both SAR and mooring data. The shoaling, turning, and dissipation of large internal waves on the shelf, and wave-wave interaction have been studied. The research plan and some preliminary results of a recent major field experiment for internal wave study in SCS in April/May 2005 will also be discussed.

Keywords: Internal Wave; SAR; South China Sea