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Spaceborne Scatterometer in Studies of Tropical Ocean-Atmosphere-Land Interaction

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The NASA Scatterometer (NSCAT) will be launched in August 1996 on the Japanese spacecraft, ADEOS-1. It will measure ocean surface wind vectors at 25 km resolution, covering over 90% of the world's ocean every two days under both clear and cloudy conditions. Results using past and simulated scatterometer data will be presented in an overview of the potential of NSCAT data in studying the tropical ocean-atmosphere interaction and the marine influence across the ocean-land boundary.

The high spatial resolution of scatterometer measurement provides details of typhoon and convective system over tropical ocean which operational numerical weather prediction usually misses. Surface pressure field near a typhoon can be derived using scatterometer winds through a boundary layer model with the assumptions of geotropic balance and gradient wind relation. The surface wind and pressure fields derived from ERS1 scatterometer are used to describe the location and intensity of typhoons in the tropical Pacific. Scatterometer winds are also used to improve the surface divergence, vertical velocity profile, moisture transport, and surface hydrologic forcing in convective systems over the warm pool. The synoptic and large-scale coverage of NSCAT will help in the monitoring of monsoon. The differences between the monsoon onsets in the South China Sea and in the Bay of Bengal are examined using scatterometer data in synergism with sea surface temperature and precipitable water observed by spaceborne radiometers. The repeated global coverage by the scatterometer also helps to unravel interannual and basin-wide climate signals, such as El Nino Southern Oscillation. Wind anomalies observed by the scatterometer are related to the eastward propagation of Kelvin waves and anomalous warming in the Pacific observed by altimeters and radiometers through an ocean general circulation model forced by the realistic wind. The same combination of spacebased data and model help to reveal upper ocean heat balance.