



# RHEEM LAB.

## [Sea Surface Observation by using a Microwave Pulse Doppler Radar]

Underwater Technology Research Center

<http://seasat.iis.u-tokyo.ac.jp/rheem/>

Ocean Environmental Engineering

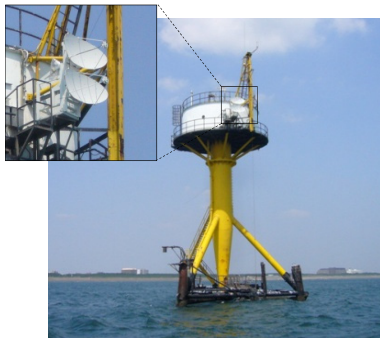
Graduate School of Frontier Sciences, Department of Ocean Technology, Policy, and Environment

### Remote Sensing of Sea Surface by Microwave Pulse Doppler Radar

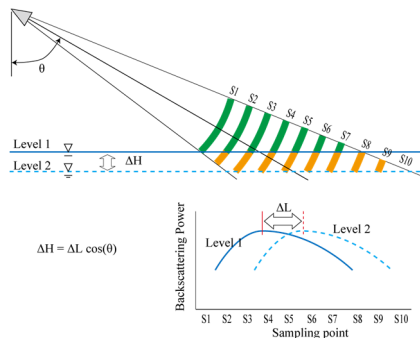
A real-time sea surface observation system by using a microwave pulse Doppler radar has been developed. The system is installed on a coastal site or an offshore platform and can observe various ocean phenomena, e.g. tsunami, tide and wave. The features of the radar are as follows.

- Real-time observation
- Remote sensing
- Easy maintenance

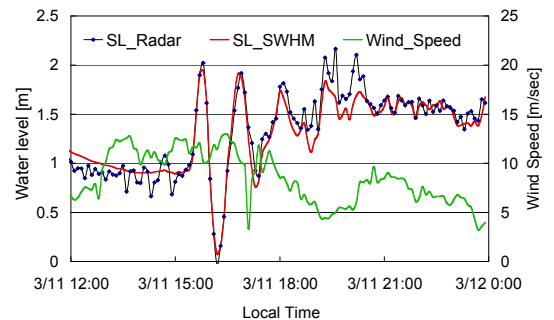
These advantages are effective in countermeasures against coastal disasters.



Hiratsuka experimental tower and pulse Doppler radar

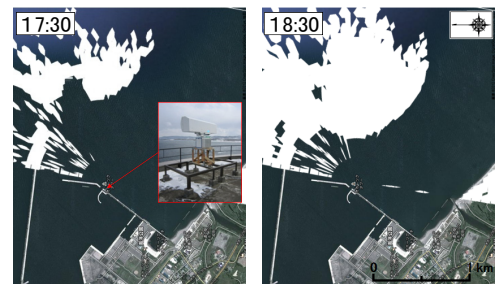


Concept of tide observation



Tsunami on March 11, 2011

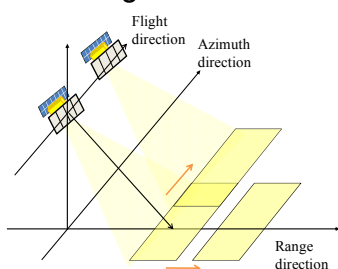
Sea ice monitoring is important to develop resources in the cold ocean. Using the difference in microwave backscattering from the sea and ice, sea ice can be detected by microwave radar. The radar which can observe sea ice position and speed in high resolution has been developed.



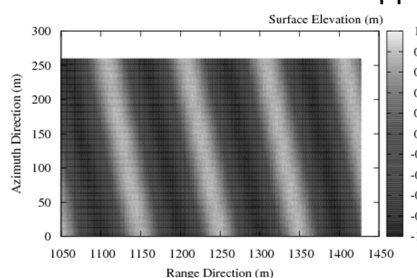
Sea ice movement on March 2, 2012

### Time Domain Numerical Simulation of Microwave Backscattering

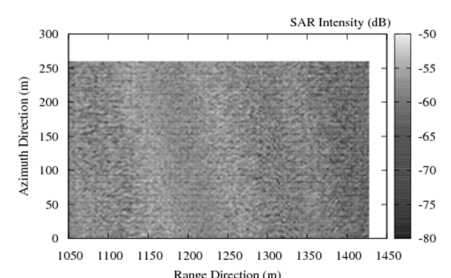
Simulation techniques have been developed to estimate microwave backscattering from the sea surface numerically. The simulation, which can be a substitute of water tank experiments, is applied to evaluate algorithms of sea surface measurements with a Doppler radar and a SAR.



Ocean SAR image simulation in time domain



Numerical sea surface (regular wave)



Simulated SAR image