

Ocean Surface Winds and Wind Waves in the Coastal Zone Using High-Resolution Satellite Observations (Understanding for each and integrated ecosystem using remote sensing, 6th International Symposium on Integrated Field Science)

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journal or publication title	Journal of Integrated Field Science
volume	6
page range	158-158
year	2009-03
URL	http://hdl.handle.net/10097/48822

Ocean Surface Winds and Wind Waves in the Coastal Zone Using High-Resolution Satellite Observations

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Wind jet is a low-level strong winds blowing from the terrestrial gaps such as straits. Because the wind jets induce highly localized and intensified air-sea-land interaction, high-resolution wind fields derived from SAR are crucial to investigate the ocean and atmosphere dynamics in coastal environment. Additionally, understanding of the wind jet and associated severe waves is now social demand for shipping, disaster prevention, marine plant maintenance, and improvement of forecast systems. Focus of a series of our studies is to illustrate the true state of the wind jets near the Japanese coast and to examine their impacts on regional air-sea-land interaction.

In this presentation, we first introduce a few case studies of terrain-induced wind jets near the Japanese coast. Based on the studies, we now pay attention to the wind jets through the straits in the Japan Sea. Only high-resolution wind fields derived from SAR can reveal the detailed structures of the wind jets. Next we examine localized wind wave responses to the wind jet using satellite and in situ observations. Then, using meteorological and wave models with high-resolution capability, validate the satellite evidences and consider the process of evolutions of wind jet and high waves.