

High Resolution Ocean Surface Vector Winds

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Spacebased scatterometers, at present, provide ocean surface wind vector at 25 km spatial resolution covering approximately ninety percent of the global ocean under clear and cloudy conditions, night and day. The spatial resolution is not sufficient to study small weather systems, such as tropical cyclones, nor processes in coastal oceans. The spatial resolution of the vector winds can be improved to approximately 12.5 km resolution by using range-compressed backscatter. These high-resolution scatterometer winds can be supplemented by observations of the synthetic aperture radar or assimilated into meso-scale numerical models to cover the last 10 km towards the coastline. Monitoring and predicting weather systems requires wind field at 6-12 hourly frequencies. For oceanographers, the highest frequency requirements are set by the inertial period timescales in mid-latitude and the diurnal timescale near the equator. Such temporal requirements cannot be achieved with a scatterometer flying on a single polar orbiting platform. At present, we have two identical scatterometers flying on QuikSCAT and ADEOS-2, and another scatterometer will be launch on the European operational spacecraft at the end of 2005. The scientific opportunities offered by flying more than one scatterometer in tandem, and producing vector winds at higher spatial and temporal resolutions will be discussed.