A Climatology Atlas of Ocean Winds

Mapping Wind Speed and Direction

The SeaWinds instrument was launched in 1999 onboard the QuikSCAT satellite. SeaWinds is an active microwave radar that measures vector winds on a scale of 25 square kilometers across an 1800-km swath. From its orbit, SeaWinds samples more than 90% of the global ocean every 24 hours.

Scatterometers, such as SeaWinds, send pulses of microwave radiation down to the wind-roughened ocean surface and measure the electromagnetic backscatter that returns. Scatterometers take multiple looks at backscatter from an area—first looking ahead of the satellite, then to the side, and then behind. From this data, algorithms can determine wind speed and direction.

Researchers with the Cooperative Institute for Oceanographic Satellite Studies (CIOSS) are presently working to maximize the data gathered by satellites such as QuickSCAT and to apply these data to societal needs.

COAS graduate student Craig Risien, working with advisor Dudley Chelton and Mark Hodges of the National Oceanographic and Atmospheric Administration (NOAA) is developing a climatological atlas of global ocean winds to be displayed on the World Wide Web.

This five-year climatology is a web-based interactive atlas from which users can retrieve wind statistics, in tabular and graphic forms, for a region of interest. The data have been averaged over 50-km regions and provide monthly averages for approximately 150,000 areas distributed evenly across the global ocean. The climatology is able to provide valuable information about the wind statistics in the many regions of the world ocean that are sparsely sampled by ships and buoys.

One of the anticipated uses of this climatology is that it will assist scientists at the NOAA Office of Response and Restoration with oil spill response activities. Additionally, NOAA Office of Response and Restoration and the National Weather Service are interested in the atlas for training purposes and for emergency response planning.

If this product proves to be as useful as it is expected to be, the next step in the development process would be to improve its updatability through the introduction of a relational database management system.

Risien’s project is one illustration of how applications derived from the huge volume of satellite observations can help organizations more effectively train for and respond to future environmental crises.

For more information:
Working draft, Climatology of Global Ocean Winds, http://numbat.coas.oregonstate.edu/cogow