

Southwest Fisheries Science Center
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
La Jolla, California

SECTION 515 PRE-DISSEMINATION REVIEW & DOCUMENTATION FORM
(5/2003)

AUTHOR/RESPONSIBLE OFFICE:

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TITLE/DESCRIPTION: QuikSCAT Global, Near Real Time Ocean Surface Wind Velocity and Divergence

PRESENTATION/RELEASE DATE: January 1, 2004

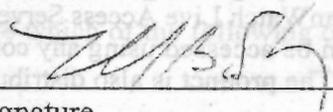
MEDIUM: Internet

PRE-DISSEMINATION REVIEW:

Name and Title of Reviewing Official: Dr. Franklin B. Schwing, Director of Environmental Research Division.

(Must be at least one level above person generating the information product)

Pursuant to Section 515 of Public Law 106-554 (the Data Quality Act), this product has undergone a pre-dissemination review.


Signature

2/15/06
Date

SECTION 515 INFORMATION QUALITY DOCUMENTATION

I. Utility of Information Product

Explain how the information product meets the standards for utility:

A. Is the information helpful, beneficial or serviceable to the intended user?

The satellite-derived products generated by the NOAA CoastWatch, West Coast Regional Node (WCRN), offer useful information to data customers in easily accessible formats. The products are utilized by a wide range of users including members of the scientific community, managers, fishing men and women, educators,

and the interested public.

The CoastWatch WCRN offers wind velocity and wind divergence measurements derived from the SeaWinds instrument on NASA's QuikSCAT satellite. The SeaWinds instrument is a microwave scatterometer designed to measure surface winds over the global ocean. These wind fields are used by researchers in a number of ongoing studies.

The High Seas Ghostnet Project seeks to reduce the environmental impact of derelict fishing gear by locating, tracking, and helping to remove the gear before it causes significant damage. A major area of focus in this project is the identification of convergence zones where derelict gear and other ocean debris collect. These convergence zones can migrate as environmental conditions change. Coastwatch QuikSCAT wind data is an important tool for the identification and tracking of ocean convergence zones, and is being used to plan investigative surveys of possible convergence zones (see <http://www.highseasghost.net/>).

The importance of wind-driven ocean upwelling events to coastal fisheries has long been known (e.g., *Smith 1968*). A number of scientific organizations, including the SWFSC, Environmental Research Division (ERD), produce estimates of upwelling for different locations based on averaged meteorological data (e.g., *Bakun, 1968*). QuikSCAT wind data is being investigated as an alternative wind data source for calculating these upwelling estimates (e.g., *Pickett, 2004*). The near-real time data from QuikSCAT can help scientists and resource managers understand how upwelling is influenced by short-term variations in the wind field, rather than restricting the study to averages of longer time spans.

B. Is the data or information product an improvement over previously available information? Is it more current or detailed? Is it more useful or accessible to the public? Has it been improved based on comments from or interactions with customers?

QuikSCAT Ocean Surface Winds data is made available in near real-time through the WCRN's CoastWatch Browser (<http://coastwatch.pfeg.noaa.gov/coastwatch/CWBrowser.jsp>), and the SWFSC ERD's OceanWatch Live Access Server (<http://las.pfeg.noaa.gov/OceanWatch.html>), and can be accessed using any computer with internet access and the appropriate browser. The product is also distributed via OpenDAP/DODS.

All venues for accessing CoastWatch data and images include information required to contact CoastWatch personnel. Improvements are continuously being implemented based on feedback from customers, with a focus on usability and accessibility.

C. What media are used in the dissemination of the information? Printed publications? CD-ROM? Internet? Is the product made available in a standard data format? Does it use consistent attribute naming and unit conventions to ensure that the information is accessible to a broad range of users with a variety of operating systems and data needs?

This is an internet product, distributed via simple browser, Live Access Server, and

OpenDAP/DODS.

The product is available in formats commonly used by imaging programs (e.g., HDF, netCDF files), GIS programs (ASCII grid), and spreadsheet programs (CSV and other simple ASCII files).

All attributes are named in a manner consistent with NOAA guidelines. All units follow System Internationale (SI) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) guidelines. At the discretion of the user, data may also be displayed and distributed in the units of measurement traditionally used by mariners and marine scientists.

II. Integrity of Information Product

Explain (Circle) how the information product meets the standards for integrity:

(A). All electronic information disseminated by NOAA adheres to the standards set out in Appendix III, _ Security of Automated Information Resources, _ OMB Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

B. If information is confidential, it is safeguarded pursuant to the Privacy Act and Titles 13, 15, and 22 of the U.S. Code (confidentiality of census, business and financial information).

C. Other/Discussion (e.g., Confidentiality of Statistics of the Magnuson-Stevens Fishery Conservation and Management Act; NOAA Administrative Order 216-100 - Protection of Confidential Fisheries Statistics; 50 CFR 229.11, Confidentiality of information collected under the Marine Mammal Protection Act.)

III. Objectivity of Information Product

(1) Indicate which of the following categories of information products apply for this product:

- Original Data
- Synthesized Products
- Interpreted Products
- Hydrometeorological, Hazardous Chemical Spill, and Space Weather Warnings, Forecasts, and Advisories
- Experimental Products
- Natural Resource Plans
- Corporate and General Information

(2) Describe how this information product meets the applicable objectivity standards. (See the DQA Documentation and Pre-Dissemination Review Guidelines for assistance and attach the appropriate completed documentation to this form.)

B. Synthesized Products

The objectivity of synthesized products is achieved by using data of known quality, applying sound analytical techniques, and reviewing the products or processes used to create them before dissemination. For synthesized products, please document the following:

Data and information sources are identified or made available upon request.

The data source is identified as NASA's Jet Propulsion Laboratory (JPL), Physical Oceanography Distributed Active Archive Center (PO.DAAC). Information regarding JPL's PO.DAAC ocean wind products, including all relevant documentation, can be viewed on the PO.DAAC QuikSCAT wind products webpage (http://podaac.jpl.nasa.gov/cgi-bin/dcatalog/fam_summary.pl?ovw+qscat). Information regarding the SeaWinds sensor and the QuikSCAT satellite can be viewed on JPL's Ocean Winds homepage (<http://winds.jpl.nasa.gov/>).

NOAA uses data of known quality or from sources acceptable to the relevant scientific and technical communities in order to ensure that synthesized products are valid, credible and useful.

Source data are gathered and processed using methods accepted by the scientific community. Data originates from the SeaWinds sensor on NASA's QuikSCAT satellite. The SeaWinds sensor is a dual-beam, rotating microwave scatterometer. The SeaWinds scatterometer bounces radar signals off the ocean surface and measures the strength of the returning backscatter signal. Wind roughens the ocean surface, which affects the backscatter signal. As the satellite passes over a site, measurements of that site are taken at differing azimuth and incident angles. The combination of these measurements is processed to wind velocity (speed and direction) using NASA-developed wind retrieval algorithms (*Freilich, 2000 and Lungu, 2001*). The resolution of the sensor is defined as one wind vector cell, 25km by 25km. The reference height for all winds is 10 meters.

In this processing, the assumption is made that wind is the only force affecting surface roughness. Rainy areas must be masked because rain will also modify the ocean surface, leading to erroneous measurements. To ensure complete masking of rain-affected areas, the ultra-conservative Multidimensional Histogram (MUDH) rain-masking algorithm is applied to the wind data (*Huddleston and Stiles, 2000*).

More information on the algorithms and processing of SeaWinds measurements can be found at the PO.DAAC's SeaWinds Documentation page, http://podaac.jpl.nasa.gov/quikscat/qscat_doc.html.

Synthesized products are created using methods that are either published in standard methods manuals, documented in accessible formats by the dissemination office, or generally accepted by the relevant scientific and technical communities.

Wind velocity fields are calculated to wind divergence using standard methods accepted by the scientific community. Wind data is made available in zonal wind (E-W direction), meridional wind (N-S direction), wind modulus (magnitude of wind velocity), vectored wind, and wind

divergence products. The methods employed in the mapping and composite image generation are consistent with techniques in the published literature. All computations, including derivatives, are performed on the individual swath data, which are then mapped to an equal angle grid of 0.25 degrees latitude by 0.25 degrees longitude using a simple arithmetic mean to produce individual and composite images of various durations (e.g., 1, 3, 8, and 14-days), following the recommendations of the International Ocean-Colour Coordinating Group (*Antoine et al., 2004*) and using methods described by *Smith and Wessel, 1990*. Graphical end products are generated using the Generic Mapping Tools software (*Wessel and Smith, 1998*). All datasets are all made available via CoastWatch Browser, LAS and OpenDAP / DODS.

NOAA includes the methods by which synthesized products are created when they are disseminated or makes them available upon request.

A basic description of all methods is included in the accompanying FGDC, CF, COARDS, and THREDDS ACDD-compliant metadata files. More detailed descriptions of these methods are available on-line, with links originating at the WCRN web page. A complete description of the methods, including the program code used to generate the end products from source data, is available upon request.

NOAA reviews synthesized products or the procedures used to create them (e.g. statistical procedures, models, or other analysis tools) to ensure their validity.

Validation of QuikSCAT source wind data has been accomplished by comparison with buoy and ship data. Studies have shown the accuracy of QuikSCAT wind data to be close to the mission requirements of 2 m/s for speed and 20° for direction (*Ebuchi et al., 2002*, see also the Center for Ocean-Atmospheric Prediction Studies, http://www.coaps.fsu.edu/scatterometry/Qscat/sci_HL.shtml).

CoastWatch products are generated and distributed on an operational basis in near real time. In addition to the efforts WCRN takes to ensure data validity, users are cautioned these products may not be appropriate for many scientific applications. Users interested in scientific applications which are not time critical are referred to an appropriate data source, whenever one is available.

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