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)

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* = point of contact.

TITLE/DESCRIPTION: CoastWatch Oceanic Front Probability Index

PRESENTATION/RELEASE DATE: January 2001 - ongoing

MEDIUM: Internet

PRE-DISSEMINATION REVIEW:
Name and Title of Reviewing Official: _Dr. Franklin Schwing, Division Director__
(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 _____ Date 2/15/06

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 Oceanic Front Probability Index describes the probability density of sea surface

temperature front formation occurring off the coast of California, based on data from the imagers carried aboard the NOAA GOES satellites. Fronts are often accompanied by surface convergence and influence surface flow (*Bowman, 1978*), and play an important role in upper ocean processes. Fronts can impact ocean fisheries, for example, by influencing the spatial distribution of biological productivity and by controlling the accumulation of marine debris, which serves as a beacon to higher trophic levels.

Oceanic fronts are an important part of the California Current System (CCS), and are vital to the understanding and management of fisheries within the CCS. A recent paper (*Castelao et al., 2005*) evaluated and used the Oceanic Front Probability Index in their study of the topographical and seasonal influences on the northern CCS off the coast of Oregon.

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?

The Oceanic Frontal Probability Index is an experimental product, distributed for scientific evaluation. It is the only near real time frontal probability index for the west coast of the continental US.

The Oceanic Frontal Probability Index is available in near real time on the Southwest Fisheries Science Center (SWFSC) Environmental Research Division's (ERD) website, Ocean Watch Live Access Server (http://las.pfeg.noaa.gov/OceanWatch.html), as well as the NOAA CoastWatch WCRN's website (http://coastwatch.pfeg.noaa.gov/coastwatch/CWBrowser.jsp), and can be accessed using any computer with internet access and the appropriate browser. The product is also available 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 column ascii files), and technical computing programs (MATLAB binary files).

All attributes are named in a manner consistent with NASA / NOAA guidelines. All units follow System Internationale (SI) and 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.)

SECTION 515 INFORMATION QUALITY DOCUMENTATION

E. Experimental Products

Experimental products are either:

1) disseminated for experimental use, evaluation or feedback, or

2) used in cases where, in the view of qualified scientists who are operating in an urgent situation in which the timely flow of vital information is crucial to human health, safety, or the environment, the danger to human health, safety, or the environment will be lessened if every tool available is used.

Objectivity of experimental products is achieved by using the best science and supporting studies available, in accordance with sound and objective scientific practices, evaluated in the relevant scientific and technical communities, and peer-reviewed where feasible.

Describe the science and/or supporting studies used, the evaluation techniques used, and note any peer-review of the experimental product.

Raw satellite data is received from NOAA's GOES satellites and processed to sea surface temperature using scientifically established methods and algorithms. Please see the CoastWatch GOES SST Data's Pre-Dissemination Review and Documentation Form for a full description of the processing of GOES satellite data to SST (*Foley and Spence, 2005*).

A description of the process used to generate the frontal probability from the GOES SST product is contained in the research summary by *Breaker et al., 2005*. A daily average SST is calculated from the hourly GOES SST for each pixel. Fronts are identified by applying an edge detection algorithm to this daily averaged SST. Pixels with gradients greater than 0.375 degrees C per pixel are classified as a front. The probability index is the number of times the pixel qualifies as a front normalized by the number of cloud-free days (pixels that are not cloud-masked) for that pixel during the time period (10-day, 14-day, and monthly durations).

The oceanic frontal probability index is currently available for the regions covered by the GOES-East and GOES-West satellites (180 to 30 degrees west longitude, 45 degrees south to 60 degrees north latitude) on the LAS and OpenDAP, and available for the west coast of the United States and Mexico on the CoastWatch Browser. The data are mapped to geographic grids (0.05 degrees by 0.05 degrees) using methods consistent with techniques in the published literature. Graphical end products are generated using the Generic Mapping Tools software (*Wessel and Smith, 1998*). Digital data are made available via a Live Access Server and OpenDAP/DODS.

In the initial processing, as described in *Breaker et al., 2005,* the data was compared with in situ data gathered by a research ship on a California Cooperative Oceanic Fisheries Investigations (CalCOFI) cruise. This method was recently used in a published study of topographical and seasonal influences on the northern California Current System off the coast of Oregon (*Castelao et al., 2005*). Additional evaluation and validation is currently in progress by a number of organizations, including the Cooperative Institute for Oceanographic Satellite Studies (CIOSS) at Oregon State University and the Department of Oceanography at University of California, Santa Cruz.

Through an iterative process, provisional documentation of theory and methods are prepared, including the various assumptions employed, the specific analytic methods applied, the data used, and the statistical procedures employed.

Extensive documentation is available on the GOES SST data product, the source data for the frontal probability data product.

A research summary is available for the original processing of the frontal probability index, accomplished by NOAA's National Environmental Satellite, Data, and Information Service (NESDIS) and the Moss Landing Marine Laboratory (MLML) (*Breaker et al., 2005*). A basic description of all methods is also included in the accompanying FGDC-compliant metadata files distributed by the WCRN's website. A complete description of the methods, including the program code used to generate the end products from the data supplied by NOAA Satellites and Information, is available upon request.

Where experimental products are disseminated for experimental use, evaluation or feedback in the form of comment or criticism, the products are accompanied by explicit limitations on their quality or by an indicated degree of uncertainty.

This product is distributed as an experimental product, and is intended for scientific evaluation by professional marine scientists. The intended use is clearly stated on the images distributed by the WCRN, as well as in the data's accompanying metadata files. Contact information for CoastWatch personnel is also posted for feedback purposes.

Where experimental products are used by NOAA in support of other NOAA products in urgent situations where the timely flow of vital information is critical, they are used by qualified scientists in conjunction with accepted non-experimental scientific methods and tools, and taking into account all available information.

Data is distributed for scientific evaluation.

References:

Bowman, M.J. 1978. Oceanic Fronts in Coastal Processes. In: Oceanic Fronts in Coastal Processes. Eds. M. Bowman and W. Esias. Springer-Verlag, Berlin, pp. 2–5.

Breaker, L. C., T. P. Mavor, and W. W. Broenkow. 2005. Mapping and monitoring large-scale ocean fronts off the California Coast using imagery from the GOES-10 geostationary satellite, Publ. T-056, 25 pp., California Sea Grant College Program, University of California, San Diego, La Jolla. (Available at http://repositories.cdlib.org/csgc/rcr/Coastal05_02)

Castelao, R. M., J. A. Barth, and T. P. Mavor. 2005. Flow-topography interactions in the northern California Current System observed from geostationary satellite data, *Geophys. Res. Lett*., 32, L24612, doi:10.1029/2005GL024401.

Foley, D.G. and L.J. Spence. 2005. Coastwatch Geostationary Operational Environmental Satellite (GOES) Sea Surface Temperature (SST) Data. Section 515 Pre-dissemination review & documentation form (5/2003). NOAA Fisheries Service, Southwest Fisheries Science Center. La Jolla, CA.

Wessel, P. and W. H. F. Smith. 1998. New, improved version of the Generic Mapping Tools released, *EOS Trans. AGU*, 79, 579.