

#7 Group C

National Oceanic and Atmospheric Administration

U.S. Department of Commerce

TOWARDS AN ENTERPRISE MONITOR FOR SIMULTANEOUS MONITORING OF MULTIPLE OCEAN PARAMETERS: SST, SALINITY, HEIGHT, WIND AND COLOR

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1. Background

(concept and need of an all ocean-parameter monitor)

- The concept is inspired by the NOAA SST Quality Monitor (SQUAM) and EUMETSAT Monitoring & Evaluation of Thematic Information from Space (**METIS**), and expanded to all satellite-based ocean parameters: SST, Salinity, Surface Height, Wind Speed and Ocean Color.
- The current overarching focus is on those satellite products which are served *via* the NOAA CoastWatch/OceanWatch program, a full list of which is available from: https://coastwatch.noaa.gov/
- In general, each product team is responsible for their product evaluation and in-depth monitoring. Consequently, there are no dedicated systems to simultaneously monitor multiple interrelated ocean parameters, e.g., sea surface height (SSH) and SST during an *El Nino* event, or sea surface wind (SSW) and sea surface salinity (SSS).





2. CoastWatch - OceanWatch - PolarWatch http://coastwatch.noaa.gov



Satellite data products for understanding and managing our oceans and coasts

Mission: to provide easy access for everyone to global and regional satellite data products for use in understanding, managing and protecting ocean and coastal resources and for assessing impacts of environmental change in ecosystems, weather, and climate.

Objective:

- Be the interface between the users of satellite data products (and related *in situ* data) and satellite remote sensing science and algorithm development.
- Serve interested people, researchers, forecasters, decision-makers within NOAA and beyond NOAA.

- To meet the need to routinely and simultaneously monitor multiple satellite ocean parameters, efforts are being put at the Satellite Oceanography and Climatology Division (SOCD) of NOAA NESDIS STAR to develop capabilities for an 'Enterprise Ocean Monitor'
- The monitor will employ advanced interactive features that will be unprecedented for most *online product monitors* but partly available in several online data visualization facilities. The objective is to comprehensively evaluate the products and steps beyond conventional validation approaches in a next-gen web-interface useful for users, producers and scientists. Most of the diagnostics provided online can also be numerically (data in ASCII) accessed by the web-users.
- This OceanWatch Monitor, like METIS, has the ability to perform both **Global** and **Regional** analyses. The choice of regions can be flexibly expanded at the back-end (fixed at the front-end web-interface). Currently, **20** oceanic regions of interest (ROI) have been pre-selected (Fig. 1) and this can be expanded as required. The system is Scalable and **Flexible** for including other types of Environmental Data Record (EDR) and more product types for a given EDR.

Highlights of functionalities in OceanWatch Monitor (OM) a) Diagnostics in both Product space and Residual Space b) Intra-theme and Inter-theme

Intra-thematic Capabilities All diagnostics are available both in the All diagnostics are available both in the Product Space and in the Residual Space Product Space and in a Residual Space (product *minus* several reference fields): ➤ Maps (raster and interactive) Histograms (interactive) Time-series (interactive) ➤Hovmöller (interactive)

Diagnostics downloadable as ASCII files

Inter-thematic Capabilities

(product *minus* climate): ➤ Maps (raster, dual, slider) ➢ Bi-variate (under consideration) Time-series (different EDRs can be chosen) for Y1 and Y2). This will allow to visualize simultaneous variation of EDRs, if any, during extreme events.

Fig. 1: A proposed monitoring framework for satellite-based all ocean parameters. The concept is inspired by NOAA SQUAM and EUMETSAT METIS and is supported by the NOAA CoastWatch/OceanWatch program, SOCD. The tool will contribute to monitoring and evaluation of satellite products available via the CW/OW program. For oceanographic analyses, monitoring will be performed for Global and 19 additional Regional areas of interest (ROI) as outlined above, for simultaneous monitoring of SST, SSS, SSH, SSW and OC.

Wish to see a demo with SSH? Catch me during the breaks.

- Provide data at global and regional spatial resolution
 - Provide timely access to low latency data for near-real- time applications.
 - Provide consistent access to high quality, long term time series data for climate and ecosystem research and applications.
 - Produce and provide tailored products for core constituent users

Further interested? See our web for contact details



Utility of satellite data: broad spatial coverage for detecting natural patterns; different spectral signature for estimation of different parameters; simultaneous monitoring of various environmental indicators; easier and sustained access to data

A program, such as CW/OW aims at providing easy access to multiple ocean parameters from one convenient location and facilitate **One-Stop Monitoring** of all these parameters.

3. Sea Surface Height (SSH) in OceanWatch Monitor (as a prototype)



• This effort is a work in progress to set a comprehensive monitoring tool for NOAA SOCD CoastWatch/OceanWatch products. The initial list of Environmental Data Records (EDRs) include: SST, Salinity, Surface height, Surface winds and Ocean Color. All diagnostics will be made available

• Initial prototype is tested with NOAA Laboratory for Satellite Altimetry's (LSA) OI level-3 sea surface

Collaborating partners and product team leads at NOAA NESDIS STAR SOCD

The 19th International GHRSST Science Team Meeting (GHRSST XIX) - Darmstadt, Germany - 4th to 8th June 2018. Contact: prasanjit.dash@noaa.gov