COVERAGE-Sargasso Sea
A Collaborative Project between NASA and the Sargasso Sea Commission

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COVERAGE Overview

CEOS Ocean Variables Enabling Research and Applications for GEO

• Initiated in a CEOS – SIT meeting in Pasadena in 2013.

• COVERAGE aims to assemble and present satellite and in situ ocean data in a compelling web-based format to demonstrate the value added of multivariate ocean data integration is support of science, applications, and public engagement.

• Platform for integrated ocean data access: “fusion environment” for multi-parameter observations, available in near-real-time, collocated to a common grid, thematically organized, including climatologies, and allow for inclusion of emerging in situ data sets (e.g. AIS ship tracking, animal tagging, etc.).

• Build a project to bring together 4 CEOS Ocean Constellations (SST, Ocean Color, Ocean Vector Winds, Ocean Surface Topography), enable broad international participation, enable widespread use of ocean satellite data, and utilize emerging data management and cloud capabilities.

• Broader Vision: International collaboration via CEOS engagement for global extension of COVERAGE involving real-time implementation and a priority-set of use cases. Spinoff is the a global product with near-real-time capabilities.
**Sargasso Sea Pilot Project** (1/2)

- Use the Sargasso Sea and NASA as a regional pilot application for Sargasso Sea Commission to ensure that the development is user-driven and effective.

- **Collaboration with the Sargasso Sea Commission (SSC)**
  - SSC: Network of international partners led by the Government of Bermuda, including UK, USA and intergovernmental agencies (IUCN, ISA) aiming to advance the recognition of the importance of the Sargasso Sea and promote its protection in accordance with the Law of the Sea Convention
  - Periodic interactions with SSC over a 1.5 year period to define the scope and contents of a pilot COVERAGE application for the Sargasso region and undertake a joint workshop to present the prototype to stakeholders

- **Value of COVERAGE for SSC**
  - Provide access to data for **data poor** high seas area
  - Illuminate the relationship between oceanographic conditions and uses of the Sargasso Sea
  - Identify ocean usages by marine species and humans
  - Highlight areas of possible conflicting usage
COVERAGE - Sargasso Web Application

- Leverages JPL web-based data visualization platform and cloud data integration technologies
- Incorporates range of co-located satellite ocean products on ~25km daily grids including: SST, SST anomaly & gradients, CHL-A, SSS, Surface Currents & Wind Speed, Sea level anomaly, SST gradients
- Diverse in situ datasets including: SPURS1 field campaign data, AIS vessel tracking data, fish telemetry data (Bluefin tunas, Mako & Tiger sharks, Eels)
- Spatial domain: Sargasso Sea defined as 15N to 45N and 80W to 20W
- Enables overlay of all parameters and the visual exploration of inter-relationships between layers
- Animation allows examination of dynamic evolution of structure and relationships between variables

MODIS CHL-A + ASCAT Ocean Surface Winds
Bluefin tuna archival tag track + Reynolds SST
AVISO Sea level anomaly
AIS Vessel Positions Heat map + Tracks
COVERAGE-Sargasso Workshop

- NASA-funded workshop hosted by SSC, Key West, FL., March 20-22, 2016

- 36 participants including SSC Secretariat, Commissioners and scientists from agencies including NASA, NOAA, academia, industry with expertise in the Sargasso region

- Objectives:
  - Expose the COVERAGE pilot project to peer review and comment.
  - Examine utility of COVERAGE for resolving relationships between ocean conditions and uses of the Sargasso Sea.
  - Identify high-priority applications for COVERAGE to enable “use cases” for future implementation

- Format:
  - Demonstration of COVERAGE prototype followed by presentations on Sargasso research activities
  - Breakout & Plenary sessions identifying priority development areas and set of technical recommendations

- Key Outcomes:
  - Workshop report/recommendations and presentation materials
  - Overwhelming consensus on usefulness of COVERAGE as an accessible data integration platform
  - Inclusion of additional datasets from sources such as NOAA/WOA and UN-IOC/OBIS
  - Need for automated data pipelines for near real-time data delivery
  - Detailed feedback from participants on tool functionality
Future Steps for COVERAGE

• Present at international meeting of the Committee on Earth Observing Satellites (Oxford, Sept. 2016) as new CEOS initiative for GEO-Blue Planet

• Develop national & international partnerships

• Identify priority set of Use Cases & Requirements

• Improve portal functionality (visualization, analytics)

• Develop near real time capability via automated data pipelines/interfaces to distributed data providers

• Support for Increased number of parameters from additional data providers

MUR-SST Gradients  
Aquarius Sea Surface Salinity  
OSCAR Surface Currents
COVERAGE DEMO

A Prototype Application for the Sargasso Sea
Questions / Discussion