COVERAGE
CEOS Ocean Variables Enabling Research & Applications for GEO

An Initiative & Platform to Simplify and Expand the Accessibility and Usage of Inter-agency Satellite & in-situ Oceanographic Data

V. Tsontos, J. Vazquez, T. Huang, M. Chin , J. Jacob , J. Roberts , F. Platt

Jet Propulsion Laboratory, California Institute of Technology

vtsontos@jpl.nasa.gov

NASA | CEOS — The Committee on Earth Observation Satellites

Motivation & Vision

- Imperative to better marshal available observations of different types for societal benefit.
- Address key constraints to access and synergistic use of multi-sensor/variate Earth Observations and ocean observing system data, particularly amongst currently underserved user communities with a need for such environmental information.
- Enable more widespread, integrated use of ocean satellite, in-situ and model data products in support of interdisciplinary open science & applications to more fully realize their potential.
- Reusable data platform and software toolkit leveraging Hybrid-Cloud infrastructures
- Support UN Decade of Oceans and UN Sustainability Goals 13 (Climate Action) & 14 (Life Below Water) to help catalyze the data-driven Blue Economy of the future.

Initiative & Project

- Cross-cutting, collaborative initiative within CEOS and NASA project
- Build upon an advanced technology platform being implemented providing access to complementary satellite & in-situ datasets via value-added data services
- Improves access to a coherent, curated set of global, interagency data products from the 4 Ocean Virtual Constellations (SST, Ocean Color, Ocean Winds, Ocean Surface Topography), including near real-time datasets, at common resolution as a baseline dataset.
- Exercises emerging cloud technologies for Earth Observation applications across heterogeneous cloud environments (NASA-AWS, EUMETSAT WEkEO)
- Demonstrates utility of the technical capability and approach in the context of an example thematic Ecosystem application relating to: "Pelagic fisheries & Biodiversity in relation to the environment"
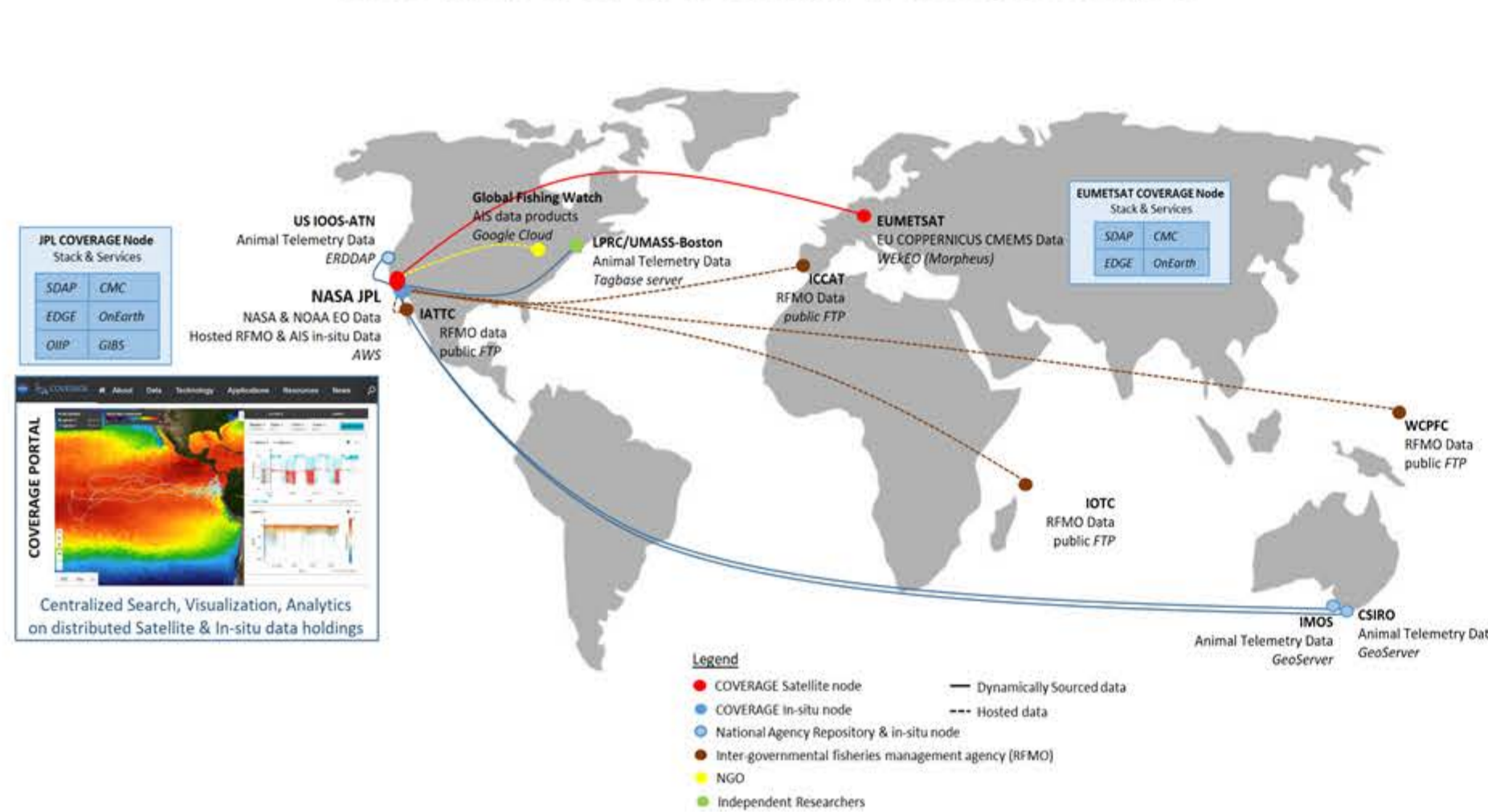
Approach

NASA | NOAA | EUMETSAT | cnes | IMOS | Australian Government Bureau of Meteorology | Copernicus Marine Service | SARGASSO SEA COMMISSION

- User community driven, Stakeholder focused, Open Source, data FAIR
- Emphasis on data interoperability standards and thematically-based data access via distributed data architecture
- Phased Development: currently Phase C (18 months)

CEOS Proposal	A. Scoping	B. Prototype Development	C. Full implementation	D. Evaluation	Possible Operations
	completed	*Completed*	*Initiating June 2021 (1.5yr)*		

- Governance: Advisory Board (stakeholder agencies)
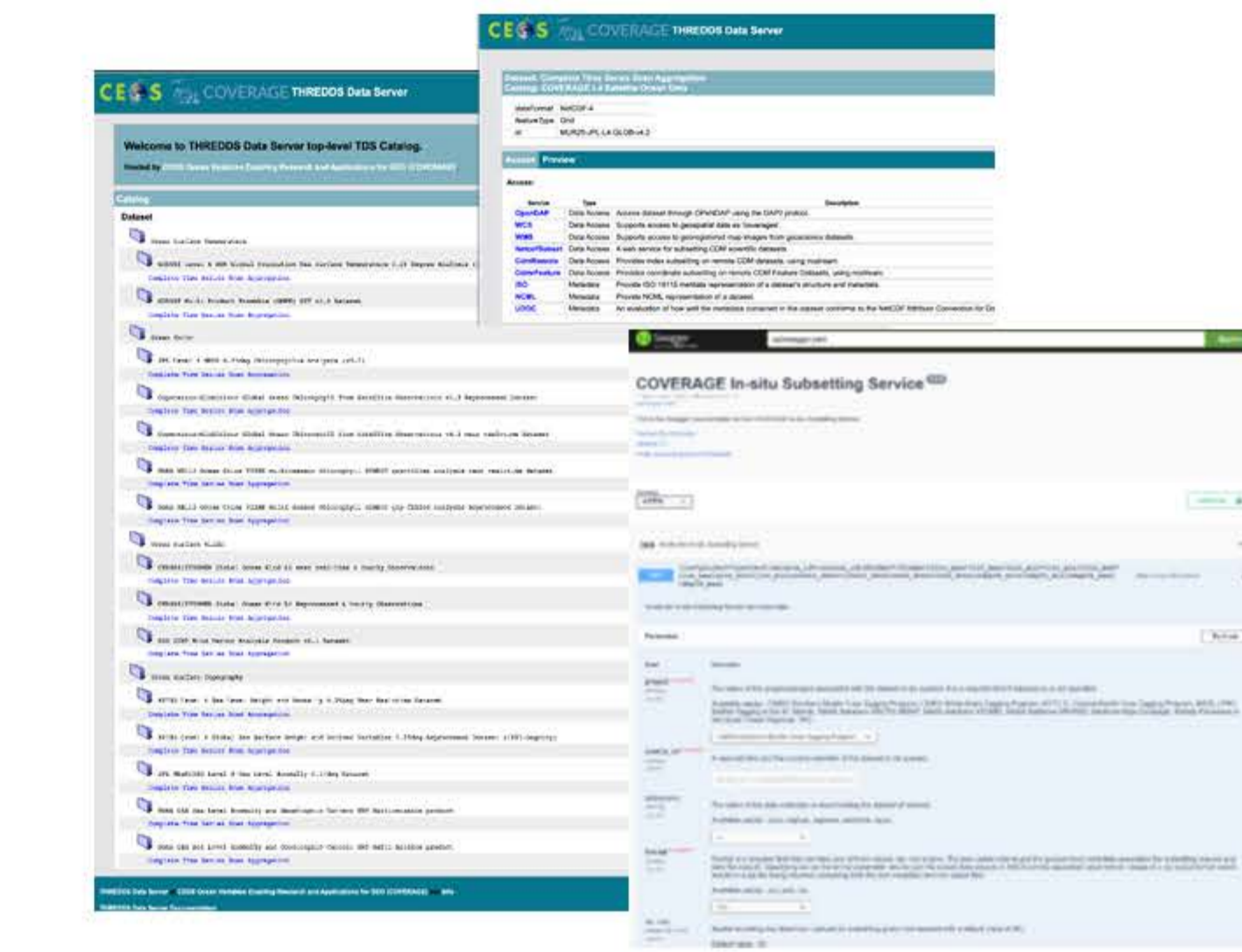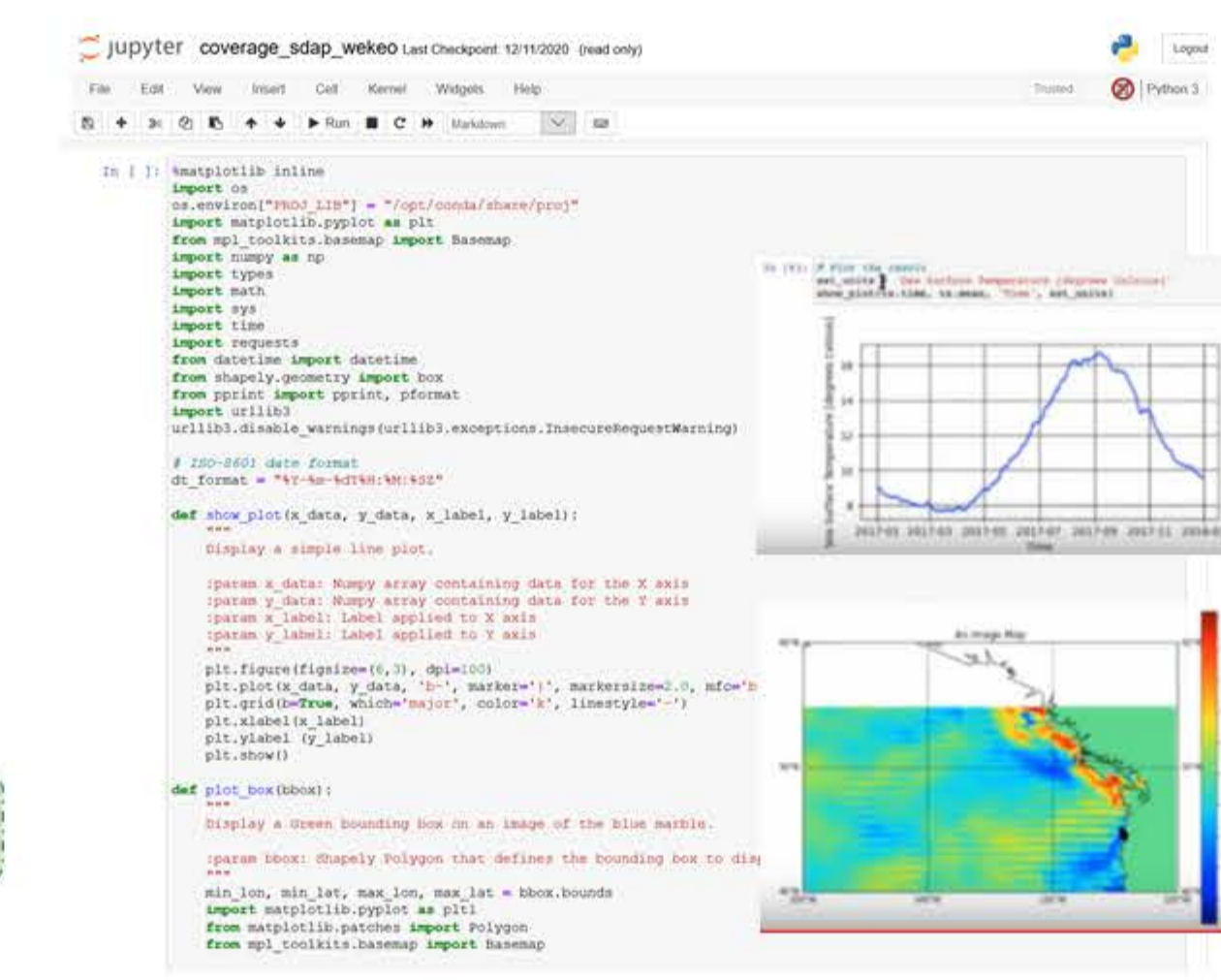- Operationalization concept and Sustainability strategy development
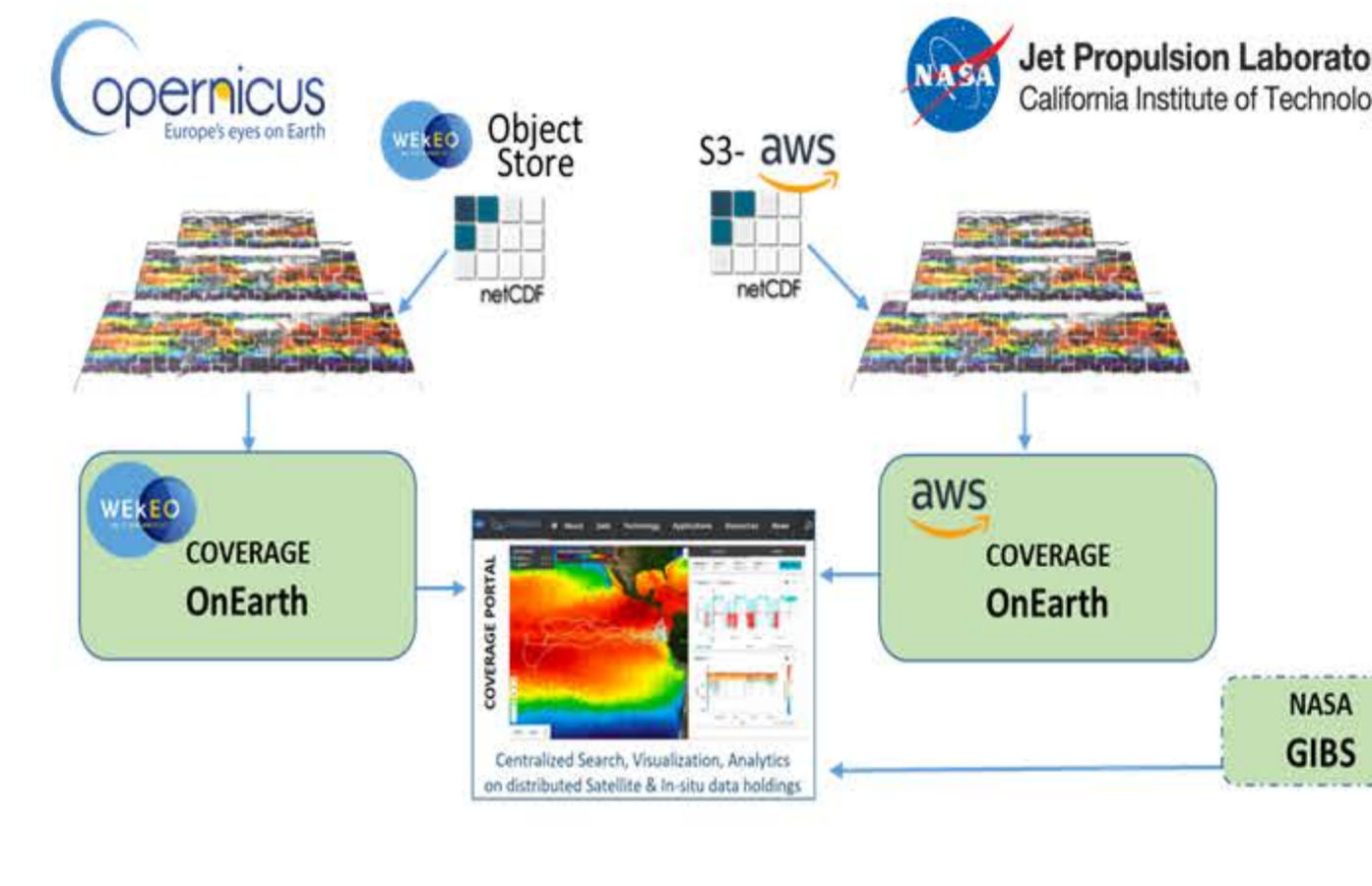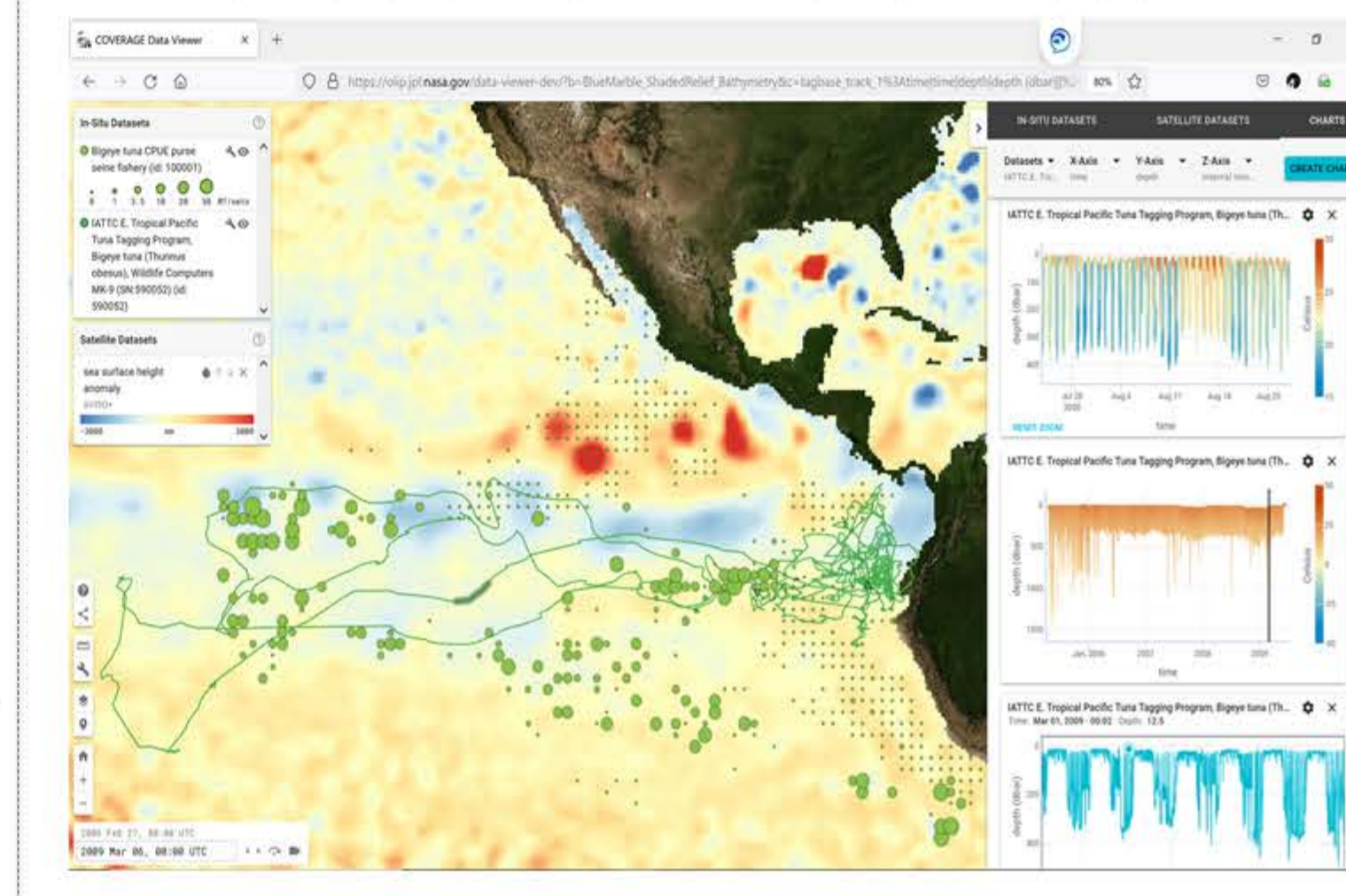
Results

Outcomes from the Phase-B (prototype implementation) project and intial Phase-C work
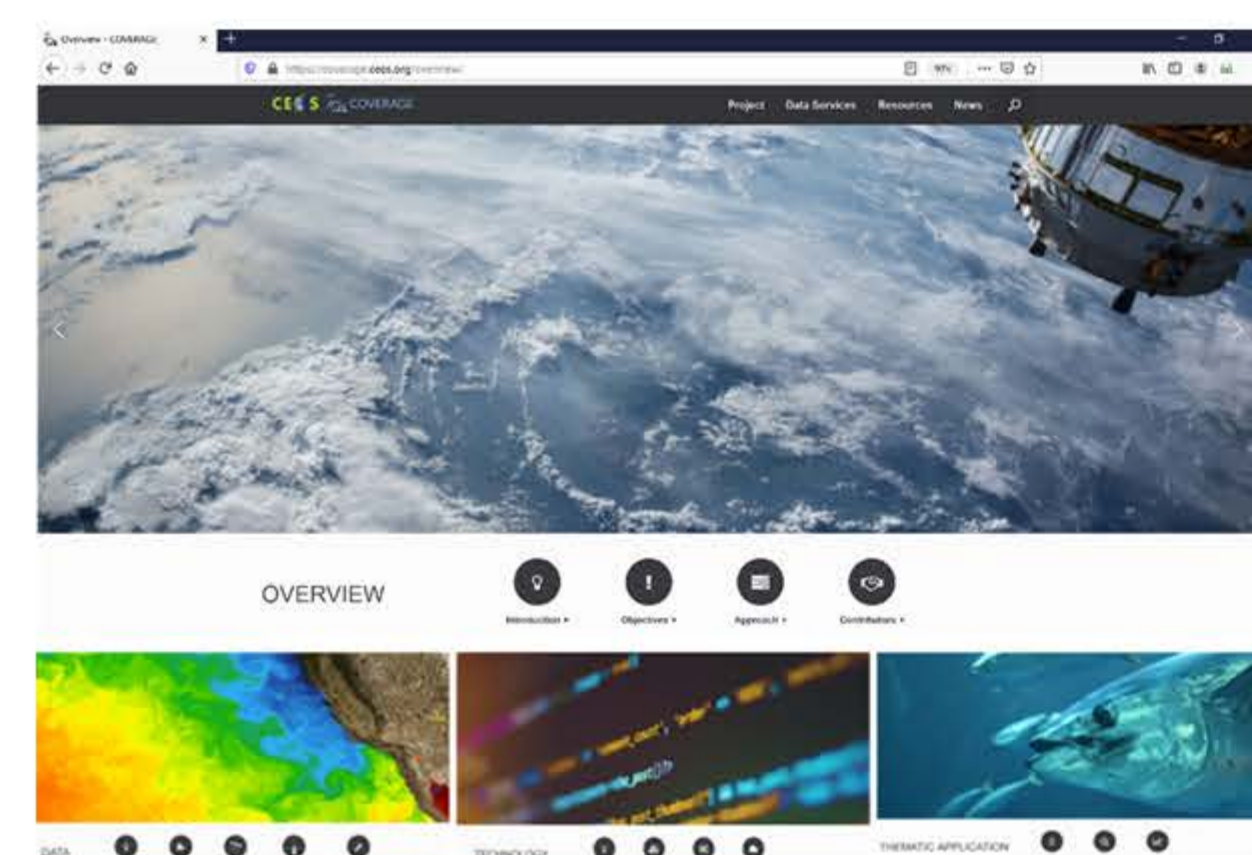
Distributed Data Architecture

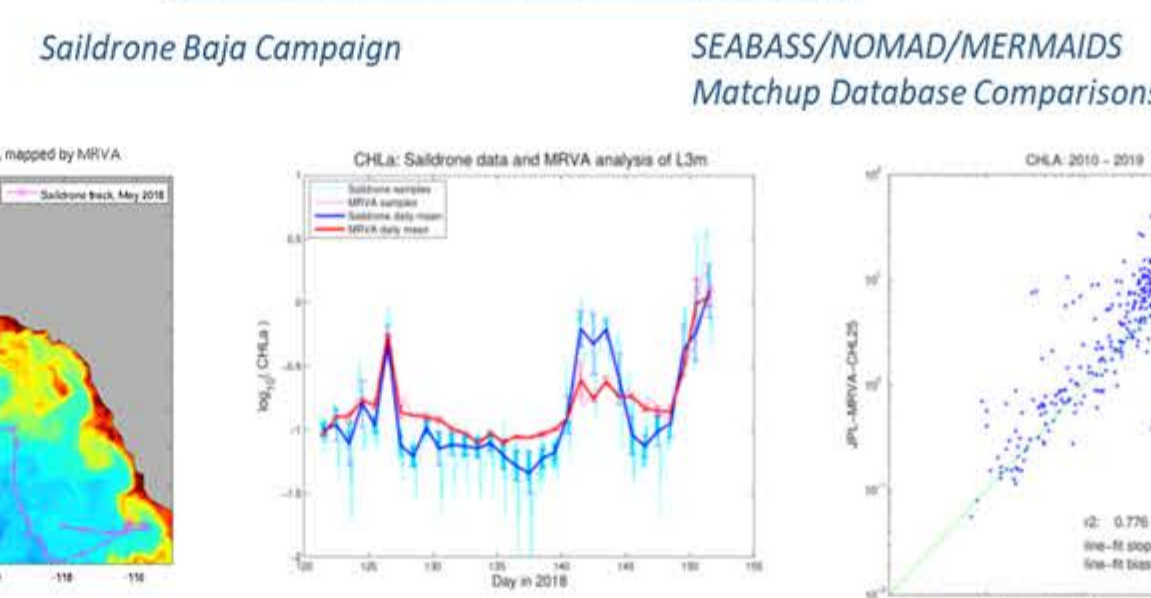### Cloud-enabled Data Services

Web-based Data Visualization — *WMTS Tiled Imagery Services* — *SDAP Analytics Services* — *THREDDS OGC & ISS OpenAPI Services*

Web Portal   https://coverage.ceos.org

OVERVIEW

L4 Ocean Color Product Development based on MUR Algorithm

L4CHLA MRVA - *in situ* Comparisons

Saildrone Baja Campaign — *SEABASS/NOMAD/MERMAIDS Matchup Database Comparisons*

L4 CHLA Product Inter-comparisons

MRVA , Globcolour, NOAA-MSL12

Datasets - Season	Correlation	Bias (mg/m**3)	RMSD (mg/m**3)
MRVA/CMEMS - Winter	0.94	-0.0575	0.144
MRVA/CMEMS - Spring	0.94	-0.0484	0.147
MRVA/CMEMS - Summer	0.95	-0.0215	0.135
MRVA/CMEMS - Fall	0.94	-0.0485	0.149
MRVA/MSL12 - Winter	0.97	-0.0189	0.094
MRVA/MSL12 - Spring	0.97	-0.0191	0.112
MRVA/MSL12 - Summer	0.93	-0.0439	0.167
MRVA/MSL12 - Fall	0.95	-0.0210	0.132

Regional Ecosystem Applications involving Inter-governmental Agency Partners

Sargasso Sea Commission (SSC)
- Promote stewardship of the Sargasso ecosystem via work program & action plan development for this high seas area
- Global Environmental Facility (GEF) & FFEM funded projects
  - Ecosystem Diagnostic Analysis (EDA), identifying trends and impacts from available environmental, biological and socio-economic data
  - Development and adoption of ecosystem-based stewardship approach for the Sargasso Sea
  - COVERAGE providing integrative data system

Inter-American Tropical Tuna Commission (IATTC)
- 21 Nation Intergovernmental Regional Fisheries Management Organization (RFMO)
- Responsible for the scientific assessment and management of Tuna and large pelagic fisheries in the E. Tropical Pacific (ETP)
- Potential applications of remote sensing data to support fisheries *Dynamic Ocean Management*, habitat analyses, MPA designation, Spatial catch forecast, By-catch mitigation
- IATTC-COVERAGE regional spin-off application