Close Window

Proof

Print

CONTROL ID: 974053

TITLE: A Virtual Ocean Observatory for Climate and Ocean Science: Synergistic Applications for SWOT and XOVWM

PRESENTATION TYPE: Assigned by Committee (Oral or Poster)

CURRENT SECTION/FOCUS GROUP: Earth and Space Science Informatics (IN)

CURRENT SESSION: IN03. Information Systems Advances for Earth Science Decadal Survey Era Missions

AUTHORS (FIRST NAME, LAST NAME): Payman Arabshahi[1], Bruce M Howe[2], Yi Chao[3], Steven Businger[4], Steve Chien[3]

INSTITUTIONS (ALL): 1. Applied Physics Laboratory, University of Washington, Seattle, WA, United States.
2. Department of Ocean and Resources Engineering, University of Hawaii, Honolulu, HI, United States.
3. Jet Propulsion Laboratory, Pasadena, CA, United States.
4. Department of Meteorology, University of Hawaii, Honolulu, HI, United States.

Title of Team:

ABSTRACT BODY: We present a virtual ocean observatory (VOO) that supports climate and ocean science as addressed in the NRC decadal survey. The VOO is composed of an autonomous software system, in-situ and space-based sensing assets, data sets, and interfaces to ocean and atmosphere models. The purpose of this observatory and its output data products are: 1) to support SWOT mission planning, 2) to serve as a vanguard for fusing SWOT, XOVWM, and in-situ data sets through fusion of OSTM (SWOT proxy) and QuikSCAT (XOVWM proxy) data with in-situ data, and 3) to serve as a feed-forward platform for high-resolution measurements of ocean surface topography (OST) in island and coastal environments utilizing space-based and in-situ adaptive sampling. The VOO will enable models capable of simulating and estimating realistic oceanic processes and atmospheric forcing of the ocean in these environments. Such measurements are critical in understanding the oceans' effects on global climate. The information systems innovations of the VOO are:

1. Development of an autonomous software platform for automated mission planning and combining science data products of QuikSCAT and OSTM with complementary in-situ data sets to deliver new data products. This software will present first-step demonstrations of technology that, once matured, will offer increased operational capability to SWOT by providing automated planning, and new science data sets using automated workflows. The future data sets to be integrated include those from SWOT and XOVWM.

2. A capstone demonstration of the effort utilizes the elements developed in (1) above to achieve adaptive in-situ sampling through feedback from space-based-assets via the SWOT simulator.

This effort will directly contribute to orbit design during the experimental phase (first 6-9 months) of the SWOT mission by high resolution regional atmospheric and ocean modeling and sampling. It will also contribute to SWOT science via integration of in-situ data, QuikSCAT, and OSTM data sets, and models, thus serving as technology pathfinder for SWOT and XOVWM data fusion; and will contribute to SWOT operations via data fusion and mission planning technology.

The goals of our project are as follows:

(a) Develop and test the VOO, including hardware, in-situ science platforms (Seagliders) and instruments, and two autonomous software modules: 1) automated data fusion/assimilation, and 2) automated planning technology;

(b) Generate new data sets (OST data in the Hawaiian Islands region) from fusion of in-situ data with QuikSCAT and OSTM data;

(c) Integrate data sets derived from the VOO into the SWOT simulator for improved SWOT mission planning;

(d) Demonstrate via Hawaiian Islands region field experiments and simulation the operational capability of the VOO to generate improved hydrologic cycle/ocean science, in particular: mesoscale and submesoscale ocean circulation including velocities, vorticity, and stress measurements, that are important to the modeling of ocean currents, eddies and mixing.

INDEX TERMS: [1910] INFORMATICS / Data assimilation, integration and fusion, [1972] INFORMATICS / Sensor web, [1908] INFORMATICS / Cyberinfrastructure, [4500] OCEANOGRAPHY: PHYSICAL.

(No Table Selected)

(No Image Selected)

Additional Details

Previously Presented Material: