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TECHNICAL NEWS

Shipboard Automated Meteorological and Oceanographic system (SAMOS) – a critical component of Global Ocean Observation Framework

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INTRODUCTION

A Shipboard Automated Meteorological and Oceanographic System (SAMOS) is a typical form of a computerized data logging system connected to sensors. It continuously records navigational (ship's position, course, speed, and heading), meteorological (winds, air temperature, pressure, moisture, rainfall, and radiation), and near-surface oceanographic (sea temperature and salinity) parameters while the vessel is at sea (Shawn R. Smith, 2005). The SAMOS initiative provides routine access to accurate, high-quality marine meteorological and near-surface oceanographic observations from research vessels and select voluntary observing ships.

OBJECTIVES

SAMOS aims to improve the quality of meteorological and near-surface oceanographic observations collected in-situ on research vessels and select volunteer observing ships (VOS). Scientific objectives of SAMOS include:

- Creating quality estimates of the heat, moisture, momentum, and radiation fluxes at the air-sea interface
- Benchmarking new satellite and model products
- Providing high quality observations to support modeling activities and global climate programs

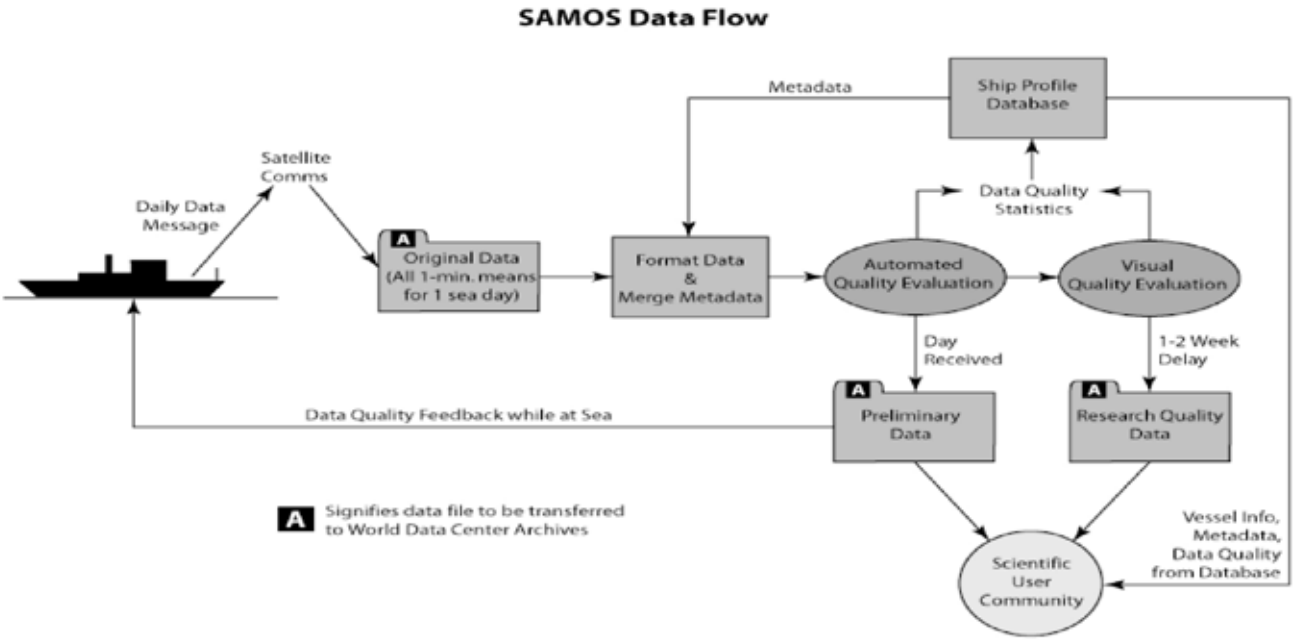
SAMOS Working System:-The flowchart of SAMOS observations starts with the computer logging system on the SAMOS Research vessel. At the end of each observation day, a set of meteorological, oceanographic, and navigational parameters at one minute interval are bundled into a single ASCII file. The daily file is attached to an email (with compression if desired) and sent via satellite communication from the vessel directly to the SAMOS DAC (Data Assembly Centre). Normally, daily files are transmitted shortly after 0000 UTC for each day a recruited vessel is at sea. All SAMOS data can be accessed through the SAMOS web page: http://samos.coaps.fsu.edu

Advantages of SAMOS:-The world Ocean Circulation Experiment (WOCE) recognized a need for an improved understanding of air-sea fluxes (Thompson et al., 2001). High quality, high accuracy fields of air-sea fluxes are necessary to support the activities of the Global Ocean Data Assimilation Experiment (GODAE). Over the ocean surface these fields can be derived using in-situ and remote sensed observations in combination with flux models. Regardless of the method used to derive the flux fields there is a requirement of standard bench marking of the flux fields. (Bourassa, M.A., 2010). The SAMOS measurements are recorded at high-temporal sampling rates (typically 1 minute or less). The high sampling rate allows more accurate estimates of the turbulent air-sea fluxes to be determined (Smith et al., 2011) and makes SAMOS data ideal for validating flux fields from numerical weather prediction models (Smith et al., 2011; Renfrew et al., 2002). The SAMOS observations have also proven to be ideal sources of validation data for new satellite systems (Bourassa et al., 2003). SAMOS observations are anticipated to provide some of the highest quality validation data for comparison with present and future remote sensing instruments and numerical models.

Limitations: The accuracy in recording of oceanographic and meteorological data depends on the proper calibration of sensors mounted on the SAMOS ships. Absence of manual observations poses challenges to the data accuracy of automated equipments. Interruptions in marine and meteorological observations occur due to sudden machine faults. Moreover lack of SAMOS ships in remote locations also affect optimum data coverage required by the scientific community.

Future Strategies for SAMOS to support Ocean Observation:

- The SAMOS vessel should provide for manual observations which will fill the gap in case due to sudden interruptions in continuous recording of oceanographic and meteorological data on account of machine faults or other factors.
- Provisions to be made for periodic sensor calibration on board the Research Vessel to ensure SAMOS data accuracy.
- The Port Meteorological Offices around the globe can play a leading role in servicing the SAMOS vessels for upkeep of SAMOS instruments and sensor calibration for data accuracy.



- The Data accuracy of SAMOS equipments can be addressed through the results of Computational Fluid Dynamics (CFD) modelling of the airflow around vessels, which will help to determine optimum sensor locations and adjust measurement biases caused by airflow around various ship structures.

ACKNOWLEDGEMENTS:

This technical news has been compiled using internet and other sources, basically to propagate the importance of SAMOS systems. I unequivocally state that the technical details given above have not been developed by me either directly or indirectly. I thank the Chief Editor of JIGU for editing and publishing this technical news item.

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Picture Courtesy: SAMOS initiative Marine Data Center, Center for Ocean-Atmospheric Prediction Studies, (COAPS) The Florida State University.

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