

# U.S. Research Vessel Surface Meteorology Data Assembly Center

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## Project Summary

The central activity of the U.S. Research Vessel Surface Meteorology Data Assembly Center (DAC) at the Florida State University (FSU) is developing and implementing the Shipboard Automated Meteorological and Oceanographic System (SAMOS) initiative (<http://samos.coaps.fsu.edu/>). The SAMOS initiative focuses on improving the quality of and access to surface marine meteorological and oceanographic data collected in-situ by automated instrumentation on research vessels. To date, 26 U.S.-operated and 3 Australian research vessels routinely transmit daily emails containing one-minute averaged meteorology and surface oceanographic data to the DAC. Broadband satellite communication facilitates this daily transfer at ~0000 UTC. A preliminary version of the data is available via web services within five minutes of receipt. The preliminary data undergo common formatting, metadata enhancement, and automated quality control (QC). Visual inspection and further scientific QC result in intermediate and research-quality products that are nominally distributed with a 10-day delay from the original data collection date. All data and metadata (e.g., instrument height, type, units) are version controlled and tracked using structured query language (SQL) databases. These data are distributed free of charge and proprietary holds via <http://www.coaps.fsu.edu/RVSMDC/html/data.shtml>, and long-term archiving occurs at the U.S. National Oceanographic Data Center (NODC).

The DAC activities focus primarily on **NOAA Strategic Plan Goals 2 and 3** by providing high-quality weather and near-surface ocean data to validate complementary satellite observations; global analyses of the ocean-atmosphere exchange of heat, moisture, and momentum; and computer-model-derived analyses of climate, weather, and ocean parameters. The data distributed by the DAC address the **Office of Climate Observation program deliverables** related to **sea surface temperature, surface currents** (via the wind), and **air-sea exchanges of heat, momentum, and fresh water**.

Research vessels, mobile observing platforms, are an essential component of the global ocean observing system. They are equipped with computerized data systems that continuously record navigational (ship position, course, speed, and heading), meteorological (winds, air temperature, pressure, moisture, rainfall, and radiation), and near-surface ocean (sea temperature and salinity) parameters while a vessel is underway. Research vessels travel to remote, hard to observe ocean locations far from the shipping lanes sampled by merchant vessels. Research vessels provide essential observations between the fixed locations of surface moorings and support side-by-side comparison to mooring data when moorings are deployed or serviced.

The DAC provides data that quantify the physical and thermodynamic processes governing the interaction between the ocean and atmosphere, key to our understanding of how marine weather systems evolve, how these systems impact the ocean, and how the oceans impact the weather. On longer time scales, understanding the interaction between the ocean and atmosphere is necessary

to assess our changing global climate system. The DAC provides high-quality marine meteorological and surface ocean measurements to the research and operational community so that they can identify and model the interactions between the ocean and atmosphere. Benefits include improved weather and climate models and forecasts that provide the public and private sector with the tools to make decisions affecting agricultural productivity, the energy industry, and daily life.

Our user community includes scientists developing algorithms to retrieve marine observations from space, those working to define the range of air-sea exchanges in extreme environments (e.g., the Southern Ocean), and atmospheric and ocean modelers seeking to verify model analyses and forecasts. For many applications, our users require observations in the extremes of the marine environment (e.g., very high or low winds) and need frequent sampling in space and/or time to identify local marine features (e.g., weather and ocean fronts). The research vessels providing observations to the DAC meet these needs and the DAC quality evaluation ensures the users receive fully documented observations to complete their analyses.