



Making use of a sea of data

While weather satellites orbit the earth monitoring the cloud systems, winds, ocean currents, and ocean-atmospheric energy flows, research vessels are at sea observing our oceans — measuring wind speed, ocean salinity, air and sea temperature, pressure, moisture, and rainfall. But what in the world do scientists do with all of these data? And how do they find what they need in the sea of information that has been collected over the years?

An important part of what researchers who study the Earth's ocean and atmosphere do is observe and measure factors such as temperature, wind speed-direction, and air pressure. The data they collect help answer questions about how earth systems work, including how and why weather events occur. Scientific data also reveal what areas require more study. **The work marine meteorologists and weather data curators do impacts everyone... even you!**

For instance, if you plan to go outside today, chances are you want to know what kind of weather to expect. Should you bring an umbrella, wear a light or heavy jacket, or maybe even consider staying in? Of course you'd want to know if there was any potential dangerous weather such as a hurricane or tornado to watch out for.

Weather prediction is an example of how ocean and atmospheric science impacts our daily lives. Certainly agricultural decision-making depends upon accurate weather forecasts, not just to help farmers schedule their crop planting and harvesting, but also to forecast the spread of diseases that

threaten their crops and can be carried on the wind. But those of us readying ourselves for school, work, or just running errands also rely on weather prediction in our day-to-day lives.

The science behind weather forecasting

Did you ever wonder what makes it possible to accurately predict the weather? Weather forecasting begins by observing phenomena that create weather events such as rainfall, storms, and temperatures. It requires an understanding of patterns observed because they offer some explanation for common phenomena and can therefore be used to predict future occurrences.



Early weather forecasters based their predictions on what they could see and measure themselves – rainfall, winds, temperature, and storm patterns – observing how these changed over time. Today, scientists also use satellites, marine towers, buoys, and ships equipped with sophisticated instruments to monitor and record these kinds of observations, making modern weather forecasting possible. In fact, accurate forecasting depends upon observations made both within the atmosphere and remotely from space-based satellites.

As a result of all these data collection techniques, there is an incredible amount of historical and current information available for scientists to analyze. However, scientists need to be able sort through this sea of information to address the questions they want to answer. Thanks to the Internet, that is now possible... no matter where the data comes from and who wants access.

Gathering and sharing ship data

The Marine Data Center at FSU COAPS is home to a project that captures and shares the extensive and nearly continuous meteorological data collected by research vessels. This **Shipboard Automated Meteorological and Oceanographic System** (known as **SAMOS**) gets the meteorological data and other measurements collected by research vessels while they are at sea. But more importantly, SAMOS makes these data available to individual researchers, organizations, and weather forecast agencies that, in turn, use them to validate weather satellite data from the National Aeronautics and Space Administration (NASA). Validated data can be used to create and improve computer models and other tools employed in weather forecasting.

Data validation is critical

It is important to remember that scientists don't just want access to **a lot** of data... they need to know that data they are using in their research has been validated, meaning it has been checked for accuracy and inconsistencies. This is particularly true for observations made by satellites in space. That is done is by comparing the satellite data to the observational data collected by research vessels at sea.

The SAMOS system is an important part of our nation's weather forecasting capabilities — **allowing scientists to validate satellite observations with what ships at sea observe.**

SAMOS
Shipboard Automated Meteorological and Oceanographic System

High-Quality Ocean & Weather Data from Ships
Temperature, Wind, Moisture, Rain, Radiation, Salinity

Satellite Measurements

More Accurate Forecasts
Drought, Flooding, Wildfire, Storms, Weather Extremes

Lives & Money Saved
Across Emergency Management, Agriculture, & Energy Sectors

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The SAMOS initiative at Florida State University is base-funded by NOAA's Ocean Observing and Monitoring Program via the Northern Gulf Institute (Cooperative Agreement #NA11OAR4320199) and the National Science Foundation's Oceanographic Instrumentation and Technical Services Program (Grant #OCE-1447797). Since 2013, the Schmidt Ocean Institute has provided funding to complete SAMOS data processing for observations from the RV Falkor.



The Florida State University (FSU) Center for Ocean-Atmospheric Prediction Studies (COAPS) is internationally known for providing high quality, innovative data products. Our goal is to provide data products that are useful for both operational and research activities and climate applications. The COAPS Marine Data Center dispenses a wide range of these products focusing on the atmosphere-ocean interface. For more information visit www.coaps.fsu.edu

