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SAMOS Surface Fluxes

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The development of a new surface flux dataset based on underway meteorological observations from research vessels will be presented. The research vessel data center at the Florida State University routinely acquires, quality controls, and distributes underway surface meteorological and oceanographic observations from over 30 oceanographic vessels. These activities are coordinated by the Shipboard Automated Meteorological and Oceanographic System (SAMOS) initiative in partnership with the Rolling Deck to Repository (R2R) project. Recently, the SAMOS data center has used these underway observations to produce bulk flux estimates for each vessel along individual cruise tracks. A description of this new flux product, along with the underlying data quality control procedures applied to SAMOS observations, will be provided.

Research vessels provide underway observations at high-temporal frequency (1 min. sampling interval) that include navigational (position, course, heading, and speed), meteorological (air temperature, humidity, wind, surface pressure, radiation, rainfall), and oceanographic (surface sea temperature and salinity) samples. Vessels recruited to the SAMOS initiative collect a high concentration of data within the U.S. continental shelf and also frequently operate well outside routine shipping lanes, capturing observations in extreme ocean environments (Southern, Arctic, South Atlantic, and South Pacific oceans). These observations are atypical for their spatial and temporal sampling, making them very useful for many applications including validation of numerical models and satellite retrievals, as well as local assessments of natural variability.

Individual SAMOS observations undergo routine automated quality control and select vessels receive detailed visual data quality inspection. The result is a quality-flagged data set that is ideal for calculating turbulent flux estimates. We will describe the bulk flux algorithms that have been applied to the observations and the choices of constants that are used. Analysis of the preliminary SAMOS flux products will be presented, including spatial and temporal coverage for each derived parameter.

The unique quality and sampling locations of research vessel observations and their independence from many models and products makes them ideal for validation studies. The strengths and limitations of research observations for flux validation studies will be discussed. The authors welcome a discussion with the flux community regarding expansion of the SAMOS program to include additional international vessels, thus facilitating and expansion of this research vessel-based flux product.