Surface meteorology from Volunteer Observing Ships

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Introduction

Current efforts to improve the predictability of climate in the need to understand the physics of the earth's atmosphere and ocean exchange have, disorientation, and momentum, and, in turn, to accurately represent the understanding that is used to make predictions. At present, one of the major goals is the generation of useful climate forecasts, whether or not physical climate models are used in today's numerical weather prediction systems. Such models may have errors that are large, compared to the size of atmospheric and oceanic interactions. To address the need for accurate climate predictions, observing systems that can provide useful information at the relevant resolutions are required. The volunteer observing ships (VOS) network, an international collaboration of oceanographers and scientists, has undertaken a program of observations using variations of the Differential GPS (DGPS) system, known as DISMET, and the Automated Marine Environmental Data Gathering System (AMEDGS). These systems have been installed on four volunteer observing ships (VOS). These vessels are in the Atlantic Ocean, the Pacific Ocean, and the Indian Ocean, providing a network of free-floating observing ships that span the entire globe.

AutoIMET System

AutoIMET was developed by WHOI to meet the need for improved marine weather and climate forecasting. It is a surface mooring that can be deployed in a variety of ocean environments, from shallow to deep waters. The AutoIMET system interfaces with WHOI’s 3000 Vishnu (data acquisition system), which automatically receives meteorological data and transmits hourly satellite reports via Inmarsat C. This system will provide the necessary data for improving the understanding of the air-sea fluxes and sea-surface temperatures in the northwest tropical Atlantic. The data collected will improve our understanding of the air-sea fluxes and sea-surface temperatures in the northwest tropical Atlantic. The primary science objectives of the AutoIMET project are to:

1. Establish a fully-instrumented surface mooring at 15°N, 51°W to collect accurate time series of surface meteorology and air-sea fluxes.
2. Improve our understanding of the air-sea fluxes and sea-surface temperatures in the northwest tropical Atlantic.
3. Collect data at a high temporal resolution (1 h) to improve our understanding of the air-sea fluxes and sea-surface temperatures in the northwest tropical Atlantic.
4. Collect data at a high spatial resolution (1 km) to improve our understanding of the air-sea fluxes and sea-surface temperatures in the northwest tropical Atlantic.

Data Analysis

Our comparisons are based on six passages of the VOS participant M/V Meteor at the NTAS buoy. We selected the subsets of the six AutoIMET records that were within ±0.5° of the buoy, and then selected the period during which the buoy was active. The data were collected from the AutoIMET sensor suite, which includes barometric pressure (mounted on the logger housing), shortwave and longwave radiation, humidity, air temperature, and wind speed. A GPS unit provides backup position data, and a radio link from the bow mast provides communication to the shore station.

The Cross-correlation function between the TAO buoy and the Atlantic VOS for eight meteorological variables is shown along with box plots giving the median value, upper and lower quartile values, and the extent of data within 1.5 times the interquartile range. The cross-correlation results show that the most significant correlations are between buoy and ship for the temperature, humidity, and wind speed. The significant correlations are between buoy and ship for the temperature, humidity, and wind speed. The significant correlations are between buoy and ship for the temperature, humidity, and wind speed. The significant correlations are between buoy and ship for the temperature, humidity, and wind speed. The significant correlations are between buoy and ship for the temperature, humidity, and wind speed. The significant correlations are between buoy and ship for the temperature, humidity, and wind speed. The significant correlations are between buoy and ship for the temperature, humidity, and wind speed. The significant correlations are between buoy and ship for the temperature, humidity, and wind speed. The significant correlations are between buoy and ship for the temperature, humidity, and wind speed. The significant correlations are between buoy and ship for the temperature, humidity, and wind speed.

Evaluation of cross-correlation functions for the six “encounters” shows that typical correlation times are ±3 to ±6 h, and show significant coherence out to 100 h. Cross-correlation results show that the most significant correlations are between buoy and ship for the temperature, humidity, and wind speed. The significant correlations are between buoy and ship for the temperature, humidity, and wind speed. The significant correlations are between buoy and ship for the temperature, humidity, and wind speed. The significant correlations are between buoy and ship for the temperature, humidity, and wind speed. The significant correlations are between buoy and ship for the temperature, humidity, and wind speed. The significant correlations are between buoy and ship for the temperature, humidity, and wind speed. The significant correlations are between buoy and ship for the temperature, humidity, and wind speed. The significant correlations are between buoy and ship for the temperature, humidity, and wind speed.

Partnerships

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Websites

Descriptions and figures are on the website http://www.whoi.edu. Currently, the data are only available to anonymous ftp at ftp://ftp.whoi.edu/pub/users/fbahr/vos

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