Discoverer Automated Weather System Data Quality Control Report

Kennard B. Kasper and Shawn R. Smith

World Ocean Circulation Experiment (WOCE)

Surface Meteorological Data Assembly Center

Center for Ocean Atmospheric Prediction Studies

Florida State University

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Introduction:

This report summarizes the quality of automated weather system (AWS) data recorded on the *Discoverer* (identifier: WTEA) between 5 January 1996 and 10 March 1996. The data were provided to the Florida State University Data Assembly Center (DAC) in electronic format by J. Bullister of the National Oceanic and Atmospheric Administration. They were converted to a standard DAC netCDF format. The data were then processed using an automated screening program which adds quality control flags to the data, highlighting potential problems. Finally, the Data Quality Evaluator reviewed the data and current flags. Flags were then added, modified, and deleted according to the judgement of the Data Quality Evaluator and other DAC personnel. An in depth description of the WOCE quality control procedures can be found in Smith et al. (1996). This data quality control report summarizes all flags for the *Discoverer* AWS data and explains reasons why these flags were assigned.

Statistical Information:

The *Discoverer* AWS data are expected to include observations taken every minute on the WOCE cruise. Values for the following variables were collected:

Time	(TIME)
Latitude	(LAT)
Longitude	(LON)
Platform Course	(PL_CRS)
Platform Speed	(PL_SPD)
Earth Relative Wind Direction	(DIR)
Earth Relative Wind Speed	(SPD)
Sea Temperature	(TS)
Atmospheric Pressure	(P)
Air Temperature	(T)
Relative Humidity	(RH)

Details for the entire cruise including dates, number of records, number of values, number of flags, and percentage flagged are listed in Table 1. A total of 901,351 values are evaluated with 16,819 flags added by the preprocessor and Data Quality Evaluator for a total of 1.87 percent of the values being flagged.

Table 1: Statistical Cruise Information

CTC	Dates	Number of Records	Number of Values	Number of Flags	Percentage Flagged
P__14S/00; P__15S/01; P__15S/02	5 Jan 96 - 10 March 96	81,941	901,351	16,819	1.87

Summary:

The AWS data from the *Discoverer* are in good condition with 1.87 percent of the data being flagged for errors. Table 2 provides the numbers and percentage of flags for each variable. A thorough discussion of the flags follows.

Table 2: Number of Flags and Percentage Flagged by Variable

Variable	G	J	K	S	Total Number of Flags	Percentage of Variable Flagged
PL_CRS				15	15	0.02
PL_SPD				6	6	0.01
DIR				339	339	0.41
SPD	15			80	95	0.12
TS	136				136	0.17
P			583	38	621	0.76
T	702			1	703	0.86
RH	1	3430	11472	1	14904	18.19
Total number of Flags	854	3430	12055	480	16819	
Percentage of All Values Flagged	0.09	0.38	1.34	0.05	1.87	

Value Greater Than 4 Standard Deviations from Climatology ("G" flags):
The preprocessor assigned "G" flags to earth relative wind speed data, sea temperature data, air temperature data, and relative humidity data. The flags identify values that are greater than 4 standard deviations from the Da Silva (1994) climatology for earth relative speed. This test does not necessarily indicate erroneous values, just extreme data.

Erroneous Data ("J" flags):
The Data Quality Evaluator administered "J" flags to relative humidity data. These flags identify data that are of poor quality by visual inspection. Specifically, relative humidity values flagged were in excess of 105 percent. One possible cause of greater than 100 percent relative humidity is a calibration drift on the humidity sensor. However, the relative humidity values do not exhibit daily fluctuations expected as the air temperature changes. Changes in relative humidity as temperature varies should occur even if the sensor had drifted off calibration. Therefore, the "J" flags values were applied and these values should **NOT BE USED.**

Data Suspect ("K" flags):
The Data Quality Evaluator assigned "K" flags to pressure and relative humidity data with the majority (95.2 percent) being applied to the relative humidity data. These flags indicate that data are suspect and should be used with caution. For the majority of "K" flags, the relative humidity values in the data set were in excess of 100 percent but not in excess of 105 percent. These values also exhibited a signal of the changing air temperature; therefore, the Data Quality Evaluator did ot apply "J" flags. Clearly, the relative humidity sensor on this cruise of the *Discoverer* had a major problem. We recommend caution be used with all the relative humidity data.

Spike in the Data ("S" flags)
The Data Quality Evaluator applied "S" flags to several parameters in this data set. The flags indicate areas in the data that are drastically out of the current data trend. Spikes are common to electronic data and may be associated with power surges that briefly disrupt the electronic integrity of the AWS systems.

Final Comments:

The *Discoverer* AWS data is generally of excellent quality (with the exception of the relative humidity data) and should be very reliable for the user.

References:

da Silva, A. M., C. C. Young and S. Levitus, 1994: Atlas of Surface Marine Data 1994, Volume 1: Algorithms and Procedures. NOAA Atlas Series. In preparation.

Smith, S. R., C. Harvey, and D. M. Legler, 1996: Handbook of Quality Control Procedures and Methods for Surface Meteorology Data. WOCE Report No. 141/96, Report WOCEMET 96-1, Center for Ocean Atmospheric Prediction Studies, Florida State University, Tallahassee, FL 32301