John P. Tully Sequential ASCII Interface Loop (SAIL) Automated Weather System Data Quality Control Report

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Addendum:

Members of the WOCE Hydrographic Project Office (WHPO) and WOCEMET met at the 13th Data Products Committee (DPC) meeting in College Station, TX to discuss reconciliation of the WOCE cruise line deisgnators. This was done in anticipation of the future release of version 3 of the WOCE global data set, and resulted in changes to several WOCE cruise line designations.

On August 6, 2001 WOCEMET deleted the line designator PRS01_/02. The quality control information for this data has been left in this report for the user, but please note that the line designator PRS01_/02 has been removed.

WOCEMET deleted the line designators PR_05_/05 and PRS01_/05. The quality control information for this data has been left in this report for the user, but please note that the line designators PR_05_/05 and PRS01_/05 have been removed.

WOCEMET deleted the line designator PRS01_/07. The quality control information for this data has been left in this report for the user, but please note that the line designator PRS01_/07 has been removed.

WOCEMET deleted the line designator PRS01_/08. The quality control information for this data has been left in this report for the user, but please note that the line designator PRS01_/08 has been removed.

WOCEMET deleted the line designator PRS01_/09. The quality control information for this data has been left in this report for the user, but please note that the line designator PRS01_/09 has been removed.

Introduction:

This report summarizes the quality of SAIL automated weather system (AWS) data on the *John P. Tully* (identifier: CG2958) during WOCE cruises between 3 Feb 1992 and 8 Mar 1996. The data were provided to the Florida State University Data Assembly Center (DAC) in electronic format by Robin Brown and Howard Freeland of the Institute of Ocean Science, Canada. They were converted to 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, a Data Quality Evaluator reviewed the data and current flags. Flags were 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). The data quality control report summarizes all flags for the *John P. Tully* SAIL AWS data and explains reasons why these flags were assigned.

Statistical Information:

The *John P. Tully* SAIL AWS data are expected to include observations taken every two minutes on each WOCE cruise. Values for the following parameters were collected:

Time	(TIME)
Latitude	(LAT)
Longitude	(LON)
Platform Course	(PL_CRS)
Platform Speed	(PL_SPD)
Platform Relative Wind Direction	(PL_WDIR)
Platform Relative Wind Speed	(PL_WSPD)
Atmospheric Pressure	(P)

Details of the cruises including dates, number of records, number of values, number of flags, and percentage flagged are listed in Table 1. A total of 721048 values are evaluated with 7133 flags added by the preprocessor and Data Quality Evaluator for a total of 0.99 percent of the values being flagged.

Table 1: Statistical Cruise Information

CTC	Cruise Dates	Number of Records	Number of Values	Number of Flags	Percentage Flagged
PR_05_/01 PR_06_/05 PRS01_/02	3 Feb 92 - 14 Feb 92	8020	64160	5998	9.35
PR_05_/04 PR_06_/09	12 May 93 - 31 May 93	13438	107504	116	0.11
PR_06_/10	7 Feb 94 - 19 Feb 94	8858	70864	22	0.03
PR_05_/05 PR_06_/11 PRS01_/05	10 May 94 - 23 May 94	10080	80640	6	0.01
PR_06_/13 PRS01_/07	7 Feb 95 - 23 Feb 95	11593	92744	303	0.33
PR_06_/14	9 May 95 - 25 May 95	12157	97256	284	0.29
PR_06_/16 PRS01_/08	25 Aug 95 - 13 Sep 95	13731	109848	394	0.36
PR_06_/15 PRS01_/09	20 Feb 96 - 8 Mar 96	12254	98032	10	0.01

Summary:

The SAIL AWS data from the *John P. Tully* are in excellent condition with only 0.99 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	B	F	J	K	S	Total Number of Flags	Percentage of Variable Flagged
LAT		537				537	0.60
LON		538				538	0.60
PL_CRS	4		5	38	60	107	0.12
PL_SPD	12		25	40	36	113	0.13
PL_WDIR			4		5	9	0.01
PL_WSPD			8		16	24	0.03
P			5805			5805	6.44
Total number of Flags	16	1075	5847	78	117	7133	
Percentage of All Values Flagged	0.00*	0.15	0.81	0.01	0.02	0.99	

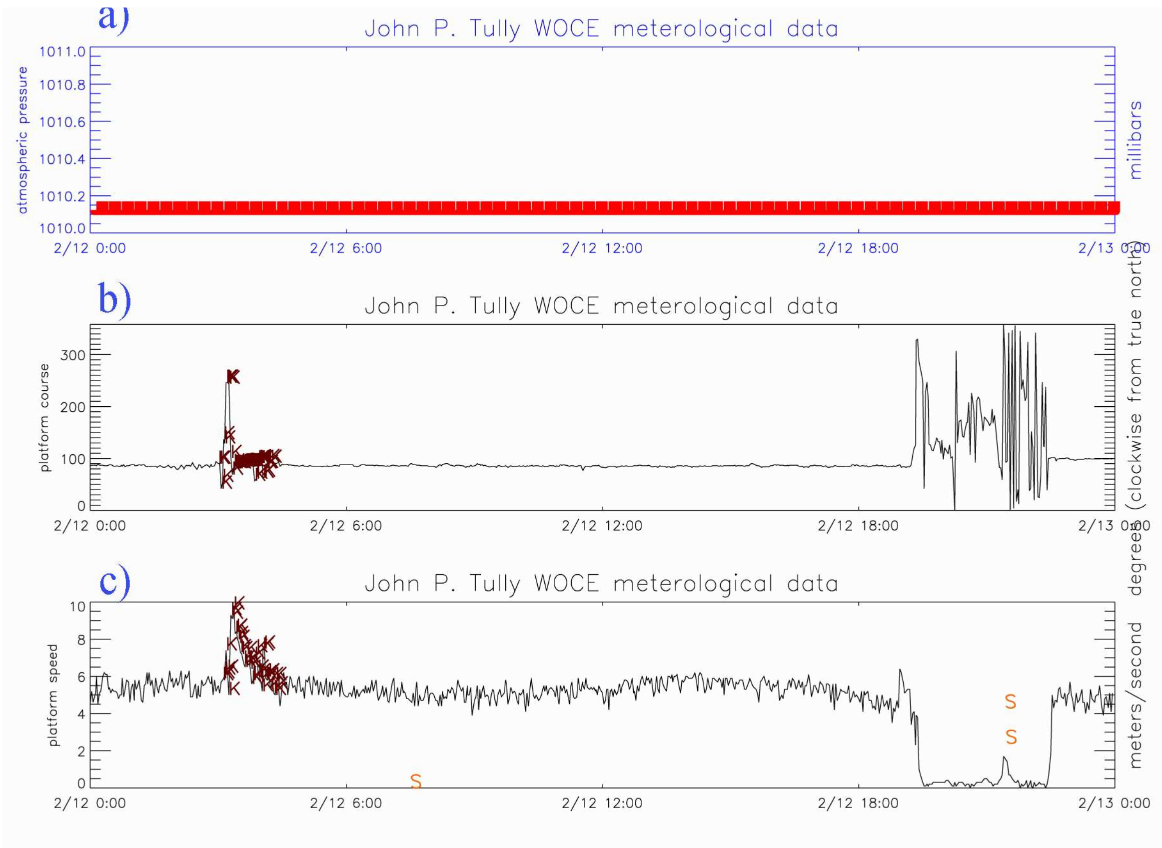
* percentage less than 0.01

<u>Value Out of Realistic Range ("B" flags)</u>
A few "B" Flags were administered to Platform Course and Platform Speed by the preprocessor. The flags identify values that are in excess of 15 meters per second for Platform Speed and in excesss of 359 degrees for Platform course. It is unlikely for a research vessel to travel at a speed of 15 meters per second, and compass values of more than 359 degrees are in error. Therefore, these data should be recognized as unrealistic and NOT BE USED.

<u>Unrelealistic Platform Velocity ("F" flags):</u>
Some latitude and longitude variables were flagged with the "F" flag. These flags indicate that the platform speed computed between sequential ship positions by the preprocessor exceeds a realistic speed for a research vessel (15 meters per second). These latitude and longitude positions should be used with caution.

Erroneous Data ("J" flags):
"J" flags were assigned to Platform Course, Platform Speed, Platform Relative Wind Direction, Platform Relative Wind Speed, and Pressure. Most (99.3 percent) of the "J" flags were applied to pressure on one cruise (3 Feb 92 - 14 Feb 92). Visual inspection revealed the pressure data to hold at a constant value for about 9 percent of the cruise. Figure 1a, a graph of the pressure data from 00:00 UTC 12 Feb 92 to 00:00 UTC 13 Feb 92, shows a period of constant pressure data. Since it is physically unrealistic to have pressure exactly constant a whole day, "J" flags were applied to pressure variables, indicating erroneous data. Clearly, some kind of instrument error occurred but we could not confirm our suspicion. Regardless, the flagged data are erroneous and should NOT BE USED.

Figure 1: SAIL data for 12 Feb 1992. Pressure a) with "J" flags marking all of the data as erroneous. Platform Course b) and Platform Speed c) with "K" flags marking the suspect data.



Data Suspect ("K" flags)
The Data Quality Evaluator assigned some "K" flags to Platform Course (PL_CRS) and Platform Speed (PL_SPD). The flags identify values that are of questionable quality. PL_CRS and PL_SPD data exhibit unusual behavior between 00:00 12 Feb 92 and 06:00 UTC 12 Feb 92. Figures 1b and 1c, graphs of PL_CRS data and PL_SPD data, respectively, show that PL_CRS is veering erratically while PL_SPD is increasing to a value of (10 ms-1). These sudden changes in

course and speed are unrealistic for a research vessel; therefore, the Data Quality Evaluator applied the "K" flag and the data should be used with caution.

Spike in the Data ("S" flags)
The Data Quality Evaluator applied "S" flags to various parameters. 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:

With the exception of the pressure data from 3 Feb 92 to 14 Feb 92, the *John P. Tully* SAIL AWS data are of excellent quality 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