John P. Tully WOCE SAIL Meteorology Data Quality Control Report

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Introduction:

This report summarizes the quality of surface meteorological data collected by the research vessel *John P. Tully* (identifier: CG2958) SAIL (Sequential System ASCII Interface Loop) system during four cruises covering seven WOCE lines. The data were provided to the Florida State University Data Assembly Center (DAC) in electronic format by H. Freeland of the Institute of Ocean Science, Canada and were converted to standard DAC netCDF format. The data were then processed using an automated screening program, which added quality control flags to the data, highlighting potential problems. Finally, the Data Quality Evaluator (DQE) reviewed the data and current flags, whereby flags were added, removed, or modified according to the judgement of the DQE and other DAC personnel. Details of the WOCE quality control procedures can be found in Smith et al. (1996). The data quality control report summarizes the flags for the *John P. Tully* surface meteorological data, including those added by both the preprocessor and the DQE.

Statistical Information:

The *John P. Tully* SAIL data include observations taken every two minutes on all four WOCE cruises. Values for the following variables were collected:

Time	TIME
Latitude	LAT
Longitude	LON
Platform Heading	PL_HD
Platform Speed	PL_SPD
Platform Relative Wind Direction	PL_WDIR
Platform Relative Wind Speed	PL_WSPD
Sea Temperature	TS
Atmospheric Pressure	P

Details of the cruises are listed in Table 1 and include cruise dates, number of records, number of values, number of flags, and total percentage of data flagged. A total of 424,882 values were evaluated with 773 flags added by the preprocessor and the DQE for a total of 0.18% of the values being flagged. Note, the March 1993 cruise does not include sea temperature data and the September 1992 cruise does not include platform heading or platform speed.

Table 1: Statistical Cruise Information

CTC	Dates	Number of Records	Number of Values	Number of Flags	Percent Flagged
PR_05_/03 PR_06_/07 PRS01_/04	09/09/92 – 09/29/92	14,881	104,167	32	0.03
PR_06_/08	03/06/93 – 03/18/93	7,281	58,248	2	0.00
PRS01_/10 PR_06_/17	05/09/96 – 05/30/96	13,860	124,740	200	0.16
PR_06_/18	08/14/96 – 09/04/96	15,303	137,727	539	0.39

Summary:

The overall quality of the data collected by the *John P. Tully* was excellent, with 0.18 percent of the reported values being flagged for potential problems. Table 2 details the distribution of flags among the variables.

Table 2: Number of Flags and Percentage Flagged for Each Variable

Variable	**G**	**K**	**S**	**T**	**Total Number of Flags**	**Percentage of Variable Flagged**
TIME				4	4	0.01
LAT			5		5	0.01
LON			7		7	0.01
PL_HD			3		3	0.01
PL_SPD						0.00
PL_WDIR			5		5	0.01
PL_WSPD			1		1	0.00*
TS		190	1		191	0.37
P	521		36		557	1.09
Total Number of Flags	521	190	58	4	773	
Percentage of All Values Flagged	0.12	0.04	0.01	0.00*	0.18	

*Percentage < 0.01

Time Duplicate Flag:
The *T* flag was assigned by the preprocessor to indicate where two data records shared identical times. Time duplications occurred on 96/05/22 at 1550Z and on 96/09/04 at 2309Z. The data records assigned to the duplicated times did not contain the same values. Therefore, the user is advised not to use the data during these time duplication occurrences.

Pressure Data:
During the August 1996 cruise, the ship encountered a deep low pressure system where pressure values dropped from 1012mb on 96/08/26 to near 980mb on 96/08/28. The pressure remained nearly steady (~980-982mb) for approximately seven hours on 96/08/28 then rapidly rose to 1015mb by the end of the day on 96/08/30. When pressure values dropped below ~ 987mb, *G* flags were assigned by the preprocessor to indicate where pressure values were greater than four standard deviations from the climatological mean (da Silva et al. 1994). The DQE determined the flagged data to be valid and the *G* flags were left in place to note the event. The pressure data from the September 1992 cruise were very noisy and the larger spikes were flagged with the S flag. The DQE recommends that the user utilize a smoother on the pressure data during this cruise.

K Flag:
During the May 1996 cruise, two areas of erratic sea temperature values occurred on 96/05/21. During these occurrences, the ship was well offshore while the sea temperatures rapidly deviated up to one degree Celsius from the data trend. These suspect values were flagged *K* by the DQE.

Missing Data:
There was a significant amount of pressure data missing during the September 1992 cruise from 92/09/18 through 92/09/24. During the March 1993 cruise, all data records were missing from 00Z on 93/03/07 through 1802Z on 93/03/08. All data resumed reporting on 93/03/08 except for the platform heading data, which was missing through 2316Z on 93/03/10.

Spikes:
Isolated spikes occurred during all four cruises. Spikes are relatively common occurrences in automated data, caused by such factors as electrical interference and ship accelerations. These individual points were assigned the *S* flag.

References:

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 32306-2840

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.