Polarstern Bridge Data Quality Control Report

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June 19, 1997

Report WOCEMET 97-15

Version 1.0

Introduction:

This report summarizes the quality of surface meteorological data collected by the Polarstern (identifier: DBLK) bridge crew during five WOCE cruises. The data were provided to the Florida State University Data Assembly Center (DAC) in electronic format by G. Koenig-Langlo at AWI-Bremerhaven, Germany. They were modified according to Appendix A and 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, the Data Quality Evaluator reviews the data and current flags. Flags are 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). The data quality control report summarizes all flags for the Polarstern bridge observations and explains reasons why these flags were assigned.

Statistical Information:

The Polarstern data were expected to include observations averaged every three hours on each of the WOCE cruises. Values for the following variables were collected:

Time	(TIME)
Latitude	(LAT)
Longitude	(LON)
Ocean Relative Wind Direction	(DIR)
Ocean Relative Wind Speed	(SPD)
Sea Temperature	(TS)
Atmospheric Pressure	(P)
Air Temperature	(T)
Dewpoint Temperature	(TD)
Present Weather	(WX)*
Total Cloud Amount	(TCA)*
Low/Middle Cloud Amount	(LMCA)*
Cloud Base Height	(ZCL)*
Low Cloud Type	(LCT)*

Middle Cloud Type	(MCT)*
High Cloud Type	(HCT)*

* Verified only for correct WMO coding.

Details of each cruise including cruise dates, number of records, number of values, number of flags, and percentage flagged are listed in Table 1. A total of 18,630 values were evaluated with 329 flags added by the preprocessor and Data Quality Evaluator for a total of 1.76 percent of the values being flagged.

Table 1: Statistical Cruise Information

CTC	Dates	Number of Records	Number of Values	Number of Flags	Percentage Flagged
SR_04_/01	09/07/89 - 10/29/89	424	3,816	107	2.80
SR_04_/02	12/01/90 - 12/30/90	240	2,160	31	1.44
SR_04_/03	05/21/92 - 08/03/90	596	5,364	116	2.16
SR_01_/01	08/08/92 - 9/27/92	404	3,636	75	2.06
SR_04_/04	12/03/92 - 01/22/93	406	3,654	0	0.00

Summary:

The bridge observations from the research vessel Polarstern are excellent in quality. The only major problem was the large number of spikes that occurred in sea temperature data. Otherwise, the flags applied by the prescreener did not represent major problems in the data. The analyst had to add very few additional flags. Table 2 details the distribution of flags among the different variables. A thorough discussion of the flags is given below.

Climatology

The prescreener compares the values of SPD, TS, P, and T to a climatology (da Silva et al. 1994) and assigns the "G" flag for values outside of four standard deviations from the mean. Much of the time the research vessel was located near Antarctica, an area characterized by highly variable weather and questionable climatology. Consequently, many "G" flags were given to SPD, TS, P, T, and RH. In all cases, the analyst believes that the data represent accurate values. The "G" flags were left simply to call attention to relatively extreme events.

Table 2: Number of Flags and Percentage Flagged by Variable

Variable	G	S	Total Number of Flags	Percentage of Variable Flagged
SPD	10		10	0.48
TS	106	92	198	9.57
P	33		33	1.59
T	87	1	88	4.25
Total number of Flags	236	93	329	1.76
Percentage of All Values Flagged	1.27	0.50	1.76	

<u>Sea Temperature</u>

Sea temperature experienced spikes of one to two degrees C when the values were below zero. Although these spikes seemed to follow a diurnal pattern, the temperature differences were too extreme to be realistic values. All of these spikes were given the "S" flag.

<u>Other Flags</u>

The analyst applied one "S" flag for an isolated spike in the temperature data.

Final Comments:

The bridge observations from the research vessel Polarstern are in excellent condition. Aside from the spike problem in TS, the user should have no problems with this data.

Appendix A: Modifications to DBLK Bridge Data

Cloud height was measured with ceiliometer. Cloud heights in meters were converted to standard WMO cloud height codes (Smith and Legler, 1996). Original ceilometer data can be provided upon request.

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

Smith, S. R. And D. M. Legler, 1996: *netCDF Code Manual for Quality Controlled Surface Meteorological Data.* Report WOCEMET 95-4, Center for Ocean Atmospheric Prediction Studies, Florida State University, Tallahassee, FL 32301