Hakuho Maru Marine Meteorological Observing System Data Quality Control Report

Cruises: P__13C/00
P__13J/00

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Introduction:

The data referenced in this report were collected from the research vessel Hakuho Maru (Call sign: JDSS; data provider: Ocean Research Institute, U. of Tokyo; P.I.: K. Taira) Marine Meteorological Observing System for 2 different WOCE cruises. The data were received in electronic format and converted into a standard FSU format. Then they were preprocessed using an automated data checking program. Next a visual inspection was completed by a Data Quality Evaluator who reviewed, modified and added appropriate quality control (QC) flags to the data. Details of the WOCE QC can be found in Smith et al (1996). The data quality control report summarizes the flags for the Hakuho Maru AWS data, including those added by both the preprocessor and the analyst.

Summary:

This data set was expected to include 1 minute resolution data for 2 WOCE cruises. The start dates, end dates, number of records, values, flags, and percentage of values flagged are included in table 1.

Table 1: Summary information for individual cruises

Cruise	Dates	Number of Records	Number of Values	Number of Flags	Percentage Flagged
P__13C/00	08/13/91 - 10/02/91	59441	832174	17482	2.10
P__13J/00	05/13/91 - 05/30/91	24237	339318	11905	3.51

Time (TIME), latitude (LAT), longitude (LON), platform heading (PL_HD), platform speed (PL_SPD), earth relative wind direction (DIR), earth relative wind speed (SPD), sea temperature (TS), atmospheric pressure (P), air temperature (T), dew-point temperature (TD), rain rate (RRATE), shortwave atmospheric radiation (RAD), and all-wave atmospheric radiation (RAD2) were analyzed for 2 cruises. A total of 1,171,450 values were checked, with 29,387 flags being added by the prescreener and DQE, resulting in 2.51% of the data being flagged. The distribution of flags for each variable sorted by flag type is detailed in table 2.

Summary:

A: Significant Problems:
11143 "B" flags were also added by the prescreener to PL_SPD during times when PL_SPD values drop below 0m/s. One possible explanation is that the speed logger recording the PL_SPD was mis calibrated, resulting in values that were below 0m/s. This cannot be confirmed, however, and further speculation is left to the user.

10967 "K" flags added to TS. For most of the days in the P__13J/00 cruise, the TS has much more variability when the ship is in motion than when it is stopped. This variability is at the most 0.5 ºC, so these data weren't considered to be spikes or bad data. However, because of this pattern, some caution should be taken when working with the TS data.

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

Variable	B	D	F	K	L	S	Total Number of Flags	Percentage of Variable Flagged
TIME							0	0.00
LAT			41		1775		1816	2.17
LON			41		1775		1816	2.17
PL_HD				16			16	0.02
PL_SPD	11143						11143	13.32
DIR				113		5	118	0.14
SPD				289			289	0.35
TS				10967		73	11040	13.19
P				48			48	0.06
T		112		2446			2558	3.06
TD		112		430			542	0.65
RRATE							0	0.00
RAD							0	0.00
RAD2							0	0.00
Total Number of Flags	11143	224	82	14309	3550	78	67922	2.51
Percentage of flags used	0.95	0.02	0.01	1.22	0.30	0.01	2.51	

B: Data value out of accepted bounds
D: Data value failed T>=Tw>=Td test
F: Unreal ship movement
K: Caution/Suspect Data value
L: Ship location over land
S: Spike in Data

2446 "K" flags added to T. T occasionally very slightly resembled the PL_CRS. This could mean that the ventilation was changed when the ship was headed in a certain direction, or that the temperature was in some other way affected by the ship's movement. When this occurred, the values of T weren't far enough from the normal pattern to be considered erroneous, however, they are far enough that some caution should be taken when using them.

LAT and LON were each flagged by the prescreener for 1775 "L", platform over land, flags. The ship appears to be positioned over the Australian continent. Attempts to confirm that the ship was travelling along some body of water were unsuccessful. Thus the flags were left as caution to the user.

RAD2 was initially flagged by the prescreener with "B" flags for values being below 0W/m2. However, since the radiation sensor was measuring all radiation, and not just shortwave, as is normally the case with other systems, values of less than 0W/m2 were expected. Thus the "B" flags applied by the prescreener were removed. All the RAD2 data are good.

B: Other cautionary flags:

These flags are added because of problems that are typical of all large data sets.

- 112 "D" flags added to T and TD for failure of T>=Tw>=Td test.
- 41 "F" flags added to LAT and LON for unreal ship movement.
- "S" flags added to TS and to DIR for various reasons.
- Varying numbers of "K" flags were added to a variable anytime the value did not seem reasonable, but no other evidence was available to support it being erroneous.

Final Note:

These data,with the exception of some of the PL_SPD values, are in very good condition. This data set should prove very useful.

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 32310.