# Chofu Maru, Ryofu Maru, Shumpu Maru, and Kofu Maru Bridge Observation Quality Control Report

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*Introduction:*

The data referenced in this report are bridge observations collected by the research vessels Chofu Maru (identifier: JCCX), Ryofu Maru (JGZK), Shumpu Maru (JFDG), and Kofu Maru (JDWX). The data provider was Michio Aoyama of the Japanese Meteorological Agency, and the data were received in electronic format. A conversion to the standard FSU format was completed. The data were then preprocessed using an automated data screening program. Next, the Data Quality Evaluator reviewed, modified and added appropriate quality control (QC) flags to the data. Details of the WOCE QC procedures can be found in Smith et al. (1996). The data quality control report summarizes the flags for the bridge observations, including those added by both the preprocessor and the Data Quality Evaluator.

*Statistical Information:*

The data referenced in this report were expected to include observations taken every 3 hours by the research vessel's bridge crew. Values for the following parameters were collected, although some variables were not measured by each research vessel and on each cruise:

| | |
|---|---|
| Time | (TIME) |
| Latitude | (LAT) |
| Longitude | (LON) |
| Earth Relative Wind Direction | (DIR) |
| Earth Relative Wind Speed | (SPD) |
| Sea Temperature | (TS) |
| Atmospheric Pressure | (P) |
| Air Temperature | (T) |
| Wet-Bulb Temperature | (TW) |
| Dewpoint Temperature | (TD) |
| Present Weather | (WX) |
| Total Cloud Amount | (TCA) |
| Low or Middle Cloud Amount | (LMCA) |
| Cloud Base Height | (ZCL) |
| Low Cloud Type | (LCT) |
| Middle Cloud Type | (MCT) |
| High Cloud Type | (HCT) |

Table 1 highlights parameters that were not collected for each of the 62 cruises described in this report. For each cruise, table 2 lists the start and end date, number of values, number of records, number of flags, and percentage of values flagged. A total of 64,934 values were evaluated for the 62 cruises and 30 flags were added by the preprocessor and Data quality Evaluator. The flagged values are 0.05 percent of the total values.

**Table 1:** Values Not Collected

| RV/CTC | TIME | LAT | LON | DIR | SPD | TS | P | T | TW | TD | WX | TCA | LMCA | ZCL | LCT | MCT | HCT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **JCCX** | | | | | | | | | | | | | | | | | |
| PR_18_/01 | | | | | | | | | | | | | | X | | | |
| PR_18_/02 | | | | | | | | | | | | | | | | | |
| PR_18_/03 | | | | | | | | | | | | | | X | | | |
| PR_18_/04 | | | | | | | | | | | | | | X | | | |
| PR_18_/06 | | | | | | | | | | | | | | | | | |
| PR_18_/07 | | | | | | | | | | | X | | | | | | |
| PR_18_/08 | | | | | | | | | | | | | | X | | | |
| PR_18_/09 | | | | | | | | | | | | | | X | | | |
| PR_18_/10 | | | | | | | | | | | | | | | | | |
| PR_18_/11 | | | | | | | | | | | | | | | | | |
| PR_18_/12 | | | | | | | | | | | | | | | | | |
| PR_19_/06 | | | | | | | | | | | | | | X | | | |
| PR_19_/07 | | | | | | | | | | | | | | X | | | |
| PR_18_/13 | | | | | | | | | | | | | | X | | | |
| PR_18_/14 | | | | | | | | | | | | | | | | | |
| PR_18_/15 | | | | | | | | | | | | | | | | | |
| PR_18_/16 | | | | | | | | | X | | | | | X | | | |
| **JGZK** | | | | | | | | | | | | | | | | | |
| PR_04_/01 | | | | | | | | | | | | | | X | | | |
| PR_02_/01 | | | | | | | | | | | | | | X | | | |
| PR_02_/02 | | | | | | | | | | | | | | | | | |
| PR_02_/03 | | | | | | | | | | | | | | | | | |
| PR_02_/04 | | | | | | | | | | | | | | | | | |
| PR_03_/02 | | | | | | | | | | | | | | X | | | |
| PR_02_/05 | | | | | | | | | | | | | | X | | | |
| PR_04_/02 | | | | | | | | | | | | | | X | | | |
| PR_02_/06 | | | | | | | | | | | | | | X | | | |
| PR_02_/07 | | | | | | | | | | | | | | X | | | |
| PR_03_/04 | | | | | | | | | | | | | | X | | | |
| PR_02_/09 | | | | | | | | | | | | | | X | | | |
| PR_01_/02 | | | | | | | | | | | | | | X | | | |
| PR_04_/03 | | | | | | | | | | | | | | X | | | |
| PR_02_/10 | | | | | | | | | | | | | | X | | | |
| PR_02_/11 | | | | | | | | | | | | | | X | | | |
| PR_03_/09 | | | | | | | | | | | | | | X | | | |
| PR_02_/12 | | | | | | | | | | | | | | X | | | |
| PR_04_/04 | | | | | | | | | | | | | | X | | | |
| PR_02_/13 | | | | | | | | | | | | | | X | | | |
| PR_02_/14 | | | | | | | | | | | | | | | | | |
| PR_02_/15 | | | | | | | | | | | | | | X | | | |
| P__09_/01 | | | | | | | | | | | | | | | | | |
| P__09S/02 | | | | | | | | | | | | | | X | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **JFDG** | | | | | | | | | | | | | | | | | |
| PR_17_/01 | | | | | | | | | | | | | | | | | |
| PR_17_/02 | | | | | | | | | | | | | | | | | |
| PR_17_/03 | | | | | | | | | | | | | | | | | |
| PR_17_/05 | | | | | | | | | | | | | | | | | |
| PR_17_/06 | | | | | | | | | | | | | | | | | |
| PR_17_/07 | | | | | | | | | | | X | | | | | | |
| PR_17_/08 | | | | | | | | | | | | | | | | | |
| PR_17_/09 | | | | | | | | | | | X | | | | | | |
| PR_17_/10 | | | | | | | | | | | | | | | | | |
| PR_17_/11 | | | | | | | | | | | | | | X | | | |
| PR_17_/12 | | | | | | | | | | | | | | X | | | |
| PR_17_/13 | | | | | | | | | | | | | | | | | |
| PR_17_/14 | | | | | | | | | | | | | | X | | | |
| PR_17_/15 | | | | | | | | | | | | | | | | | |
| PR_17_/16 | | | | | | | | | | | | | | | | | |
| PR_17_/18 | | | | | | | | | X | | | | | | | | |
| PR_17_/20 | | | | | | | | | X | | | | | X | | | |
| **JDWX** | | | | | | | | | | | | | | | | | |
| PR_03N/01 | | | | | | | | | | | | | | | | | |
| PR_03N/02 | | | | | | | | | | | | | | X | | | |
| PR_03N/03 | | | | | | | | | | | | | | | | | |
| PR_03N/04 | | | | | | | | | | | | | | X | | | |

**Table 2:** Statistical Cruise Information

| RV/CTC | Dates | Number of Records | Number of Values | Number of Flags | Percentage Flagged |
|---|---|---|---|---|---|
| **JCCX** | | | | | |
| PR_18_/01 | 1/24/91-1/30/91 | 51 | 816 | 0 | 0 |
| PR_18_/02 | 4/27/91-5/6/91 | 75 | 1275 | 0 | 0 |
| PR_18_/03 | 8/3/91-8/9/91 | 47 | 752 | 0 | 0 |
| PR_18_/04 | 10/16/91-10/25/91 | 77 | 1232 | 0 | 0 |
| PR_18_/06 | 4/25/92-5/4/92 | 74 | 1258 | 0 | 0 |
| PR_18_/07 | 7/24/92-7/29/92 | 43 | 688 | 0 | 0 |
| PR_18_/08 | 10/5/92-10/7/92 | 19 | 304 | 0 | 0 |
| PR_18_/09 | 1/19/93-1/26/93 | 57 | 912 | 0 | 0 |
| PR_18_/10 | 4/26/93-5/5/93 | 73 | 1241 | 0 | 0 |
| PR_18_/11 | 7/21/93-7/29/93 | 47 | 799 | 0 | 0 |
| PR_18_/12 | 10/18/93-10/22/93 | 34 | 578 | 0 | 0 |
| PR_19_/06 | 10/29/93-10/31/93 | 19 | 304 | 0 | 0 |
| PR_19_/07 | 11/6/93-11/9/93 | 29 | 464 | 0 | 0 |
| PR_18_/13 | 1/18/94-1/22/94 | 31 | 496 | 0 | 0 |
| PR_18_/14 | 4/26/94-4/30/94 | 37 | 629 | 0 | 0 |
| PR_18_/15 | 7/20/94-7/27/94 | 53 | 901 | 0 | 0 |
| PR_18_/16 | 1/17/95-1/21/95 | 32 | 480 | 0 | 0 |
| R/V Total | | 798 | 13129 | 0 | 0 |
| **JGZK** | | | | | |
| PR_04_/01 | 6/15/90-6/29/90 | 114 | 1824 | 0 | 0 |
| PR_02_/01 | 7/3/90-7/13/90 | 78 | 1248 | 0 | 0 |
| PR_02_/02 | 7/21/90-7/30/90 | 75 | 1275 | 0 | 0 |
| PR_02_/03 | 11/3/90-11/11/90 | 69 | 1173 | 1 | 0.09 |
| PR_02_/04 | 11/17/90-11/27/90 | 80 | 1360 | 0 | 0 |
| PR_03_/02 | 12/4/90-12/16/90 | 95 | 1520 | 0 | 0 |
| PR_02_/05 | 1/19/91-2/5/91 | 135 | 2160 | 1 | 0.05 |
| PR_04_/02 | 6/7/91-6/21/91 | 113 | 1808 | 2 | 0.11 |
| PR_02_/06 | 6/25/91-7/6/91 | 88 | 1408 | 2 | 0.14 |
| PR_02_/07 | 7/14/91-7/23/91 | 76 | 1216 | 0 | 0 |
| PR_03_/04 | 11/16/91-11/28/91 | 99 | 1584 | 0 | 0 |
| PR_02_/09 | 1/19/92-2/4/92 | 127 | 2032 | 7 | 0.34 |

| | | | | | |
|---|---|---|---|---|---|
| PR_01_/02 | 2/10/92-3/9/92 | 125 | 2000 | 0 | 0 |
| PR_04_/03 | 6/10/92-6/24/92 | 113 | 1808 | 4 | 0.22 |
| PR_02_/10 | 6/29/92-7/9/92 | 80 | 1280 | 1 | 0.08 |
| PR_02_/11 | 7/17/92-7/26/92 | 78 | 1248 | 0 | 0 |
| PR_03_/09 | 10/23/92-10/30/92 | 54 | 864 | 0 | 0 |
| PR_02_/12 | 1/20/93-2/4/93 | 118 | 1888 | 0 | 0 |
| PR_04_/04 | 6/10/93-6/24/93 | 117 | 1872 | 2 | 0.11 |
| PR_02_/13 | 6/29/93-7/10/93 | 86 | 1376 | 2 | 0.15 |
| PR_02_/14 | 7/18/93-7/28/93 | 81 | 1377 | 0 | 0 |
| PR_02_/15 | 1/19/94-2/6/94 | 142 | 2272 | 0 | 0 |
| P__09_/01 | 7/8/94-7/28/94 | 164 | 2788 | 4 | 0.14 |
| P__09S/02 | 8/2/94-8/24/94 | 174 | 2784 | 4 | 0.14 |
| R/V Total | | 2481 | 40165 | 30 | 0.07 |
| **JFDG** | | | | | |
| PR_17_/01 | 2/24/91-2/27/91 | 20 | 340 | 0 | 0 |
| PR_17_/02 | 5/2/91-5/5/91 | 21 | 357 | 0 | 0 |
| PR_17_/03 | 7/18/91-7/20/91 | 20 | 340 | 0 | 0 |
| PR_17_/05 | 2/4/92-2/14/92 | 32 | 544 | 0 | 0 |
| PR_17_/06 | 4/25/92-4/29/92 | 32 | 544 | 0 | 0 |
| PR_17_/07 | 7/9/92-7/13/92 | 32 | 512 | 0 | 0 |
| PR_17_/08 | 9/22/92-10/2/92 | 67 | 1139 | 0 | 0 |
| PR_17_/09 | 2/12/93-2/15/93 | 29 | 464 | 0 | 0 |
| PR_17_/10 | 5/26/93-6/4/93 | 28 | 476 | 0 | 0 |
| PR_17_/11 | 7/13/93-7/18/93 | 38 | 608 | 0 | 0 |
| PR_17_/12 | 7/25/93-7/26/93 | 11 | 176 | 0 | 0 |
| PR_17_/13 | 10/11/93-10/13/93 | 9 | 153 | 0 | 0 |
| PR_17_/14 | 2/13/94-2/19/94 | 31 | 496 | 0 | 0 |
| PR_17_/15 | 4/28/94-5/2/94 | 34 | 578 | 0 | 0 |
| PR_17_/16 | 7/15/94-7/19/94 | 28 | 476 | 0 | 0 |
| PR_17_/18 | 4/24/95-4/29/95 | 27 | 432 | 0 | 0 |
| PR_17_/20 | 8/21/95-8/25/95 | 34 | 510 | 0 | 0 |
| R/V Total | | 493 | 8145 | 0 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| **JDWX** | | | | | |
| PR_03N/01 | 10/20/90-10/31/90 | 88 | 1496 | 0 | 0 |
| PR_03N/02 | 10/12/91-10/20/91 | 66 | 1056 | 0 | 0 |
| PR_03N/03 | 11/3/92-11/6/92 | 31 | 527 | 0 | 0 |
| PR_03N/04 | 11/12/92-11/15/92 | 26 | 416 | 0 | 0 |
| R/V Total | | 211 | 3495 | 0 | 0 |

**Table 3: Number of Flags and Percentage Flagged for Each Variable On the R/V Ryofu Maru (JGZK)**

| Variable | F | G | Q | S | Total Number of Flags | Percentage of Variable Flagged |
|---|---|---|---|---|---|---|
| **TIME** | | | | | 0 | 0 |
| **LAT** | 8 | | | | 8 | 0.32 |
| **LON** | 8 | | | | 8 | 0.32 |
| **DIR** | | | 1 | 1 | 2 | 0.08 |
| **SPD** | | 3 | 1 | 1 | 5 | 0.20 |
| **TS** | | | | 2 | 2 | 0.08 |
| **P** | | 1 | | 1 | 2 | 0.08 |
| **T** | | | | 1 | 1 | 0.04 |
| **TW** | | | | 1 | 1 | 0.04 |
| **TD** | | | | 1 | 1 | 0.04 |
| **WX** | | | | | 0 | 0 |
| **TCA** | | | | | 0 | 0 |
| **ZCL** | | | | | 0 | 0 |
| **LCT** | | | | | 0 | 0 |
| **MCT** | | | | | 0 | 0 |
| **HCT** | | | | | 0 | 0 |
| **LMCA** | | | | | 0 | 0 |
| **Total Number of Flags** | 16 | 4 | 2 | 8 | 30 | |
| **Percentage of All Values Flagged** | 0.04 | 0.01 | 0.00* | 0.02 | 0.07 | |

* value less than 0.01 percent

*Summary:*

The bridge observations are in excellent condition with only 0.05 percent of the total data being flagged for errors. In addition, table 2 reveals that flags were only applied to the JGZK bridge observations. Table 3 summarizes these flags, accounting for 0.07% of the JGZK data. A discussion of the flags follows.

<u>Unrealistic Platform Speed ("F" flags):</u>
A few latitude and longitude variables were flagged with the "F" flag. These flags indicate that the platform speed computed 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.

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

<u>Data Arrived at the DAC Flagged Questionable ("Q" flags):</u>
"Q" flags represent values that arrived at the DAC already flagged as suspect. No reason for these suspect values was provided to the DAC; however, the flags were retained and converted to our format. The data should be used with caution.

<u>Spike in the Data ("S" flags):</u>
The Data Quality Evaluator applied "S" flags to various parameters. The flags indicate values that are drastically out of the current data trend.

*Final Comments:*

These data are in excellent condition and should prove reliable for the user. Keep in mind that many of the cruises are missing values for ZCL.

*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.

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.