

# SOT ANNUAL REPORT FOR 2010

## RSMC EXETER MONITORING REPORT

*(Submitted by Colin Parrett, Met Office, UK)*

This document provides information on the data quality monitoring conducted by the Regional Specialized Meteorological Centre (RSMC) Exeter operated by the United Kingdom Met Office.

### 1. Monitoring the quality and timeliness of VOS observations

1.1 The Met Office (RSMC Exeter), as WMO-designated lead centre for monitoring the quality of surface marine meteorological data (observations from ships, buoys and other in situ marine platforms), compares observations from individual platforms with the Met Office's NWP global model background 6-hour forecast fields for each variable. Platforms for which the observed values differ from the background by a significant amount are flagged as 'suspect'.

1.2 Monthly lists of suspect platforms are made available to other monitoring centres and to WMO via the Met Office web site at <http://research.metoffice.gov.uk/research/nwp/observations/monitoring/index.html> *(please note that the above URL may change during 2011)*. An extract from the suspect monitoring list for January 2011 is attached at Annex A. Each current suspect ship can be linked to a quality plot covering the previous month, showing time-series of observation-minus-background (o-b) values.

1.3 Initially only mean sea level pressure was monitored, but over the years wind speed, wind direction, sea surface temperature, air temperature and relative humidity have been added. The current monthly monitoring criteria for the 6 variables are shown in Annex B.

1.4 The Met Office also produces monthly lists of monitoring statistics for the VOS fleets recruited by certain countries. To maintain up to date VOS fleet lists for the countries concerned, the Met Office uses WMO Pub47 and the latest ship metadata from the E-SURFMAR web site. To ensure that recently recruited VOS vessels are included, the Met Office also receives monthly fleet updates from a number of countries.

1.5 National focal points are notified when the latest VOS monthly monitoring reports and suspect lists become available on the Met Office website by means of an email sent by the Met Office to the SOT and PMO mailing lists. It is important therefore that focal points wishing to receive this monitoring information check that their JCOMMOPS mailing list information is kept up to date. However, the monthly monitoring statistics continue to be e-mailed directly to major VOS operating countries. Any other national focal points who may wish to receive directly e-mailed copies of their monthly monitoring lists or 'suspect' ship lists should advise the Met Office of their e-mail address.

1.6 Every 6 months more detailed marine monitoring reports are produced and made available to the WMO Secretariat via the Met Office web site. The statistics relating to suspect VOS operated by specific members are extracted from the report and distributed by the Secretariat to national focal points for the members concerned, under a covering letter requesting that remedial action be taken to correct the problems. The most recent version of the biannual report on the quality of marine surface observations can be found at: <http://research.metoffice.gov.uk/research/nwp/observations/monitoring/marine/Biannual/index.html>

1.7 Timeliness information for VOS reports received at the Met Office is also available from the web site at

<http://research.metoffice.gov.uk/research/nwp/observations/monitoring/marine/TOR/index.html>.

This includes a table summarising the data timeliness for each country's ship reports as well as graphs showing the timeliness for all VOS ships and for the main VOS operating countries. January 2011 data is shown in Annex C, where it can be seen from the upper graph that the majority of ship reports were received promptly, with over 50% received within 15 minutes and 90% within 60 minutes of the observation time. With the cut-off time for operational NWP global data assimilation being typically 90-150 minutes after the main analysis times, more than 90% of global VOS data continues to be received in time to be assimilated. Timeliness information for individual call-signs on the Pub47 list is also available from the website.

1.8 The Met Office has recently developed a ranking scheme for VOS ships, for use in assessing the relative value of individual ships to NWP, and the latest results for 2010 are available from the web site at

<http://research.metoffice.gov.uk/research/nwp/observations/monitoring/marine/VOSranking/index.html>. The scheme takes into account the number of reports received from each ship, their quality and their timeliness.

1.9 The Met Office is still unable to monitor the (mostly Japanese) SHIP-masked data, as the data with real call-signs (collected from JMA's FTP server) has not been routed into the Meteorological database due to issues concerning its security. Consequently, to ensure that the monitoring of VOS does not suffer further, the Met Office (RSMC Exeter) would prefer countries adopting a masking scheme (prior to the ENCODE scheme) to choose one that assigns a unique identifier for each ship.

## **2. Monitoring for the VOS Climate (VOSClim) Project**

2.1 The Met Office continues to act as the Real Time Monitoring Centre (RTMC) for the VOSClim Project, providing monthly monitoring statistics for all ships to the Data Assembly Centre (DAC) and sending monthly suspect lists to the national focal points. The monitoring criteria are given in Annex D.

2.2 The Met Office RTMC also continues to extract data from the GTS for each project ship and sends this, together with co-located model field values, to the DAC.

2.3 Agreement has recently been obtained at the Met Office to extend the data sent to the DAC (NCDC) to encompass all ship and buoy reports and their co-located model field values. (The work at the RTMC to include this extra data is scheduled for 2011.)

## ANNEX A

### EXAMPLE OF MONTHLY SUSPECT LIST

SEARCH Met Office

[Home](#) | [Research](#) | [NWP](#) | [Observations](#) | [Observation Monitoring](#) | [Surface Marine Monitoring](#) | [VOS MMR](#) | [Pub47 Suspects](#)

[NWP](#) | [Climate](#) | [Seasonal forecasting](#) | [Atmospheric processes](#) | [Oceanography](#) | [Projects](#) | [The stratosphere](#)

#### Pub47 VOS Suspects for Jan 2011

To view the suspect threshold for each variable and statistic, hover your cursor over the relevant column. Please note that the bias and standard deviation statistics listed below exclude observations having gross errors.

- [Links](#)
- [Observation Processing](#)
- [Observation Types](#)
- [Quality Control](#)
- [Observation Monitoring](#)
- [News](#)
- [News releases](#)
- [Contact](#)
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| PRESSURE (hPa)       |                                      |           |       |        |       |       |                         |
|----------------------|--------------------------------------|-----------|-------|--------|-------|-------|-------------------------|
| CTRY CODE            | SHIP NAME                            | CALL SIGN | TOTAL | GE (%) | BIAS  | SD    | Graph                   |
| CA                   | GRIFFON                              | CGDS      | 541   | 42     | -12.3 | 0.7   | <a href="#">QC plot</a> |
| DE                   | JPO TUCANA                           | A8RW4     | 23    | 0      | -4.6  | 2.9   | <a href="#">QC plot</a> |
| DE                   | SANTA CLARA                          | DAJT      | 74    | 0      | -4.8  | 0.8   | <a href="#">QC plot</a> |
| EU                   | CELTIC VOYAGER (AWS)                 | BATEU03   | 46    | 43     | 11.5  | 2.1   | <a href="#">QC plot</a> |
| GB                   | CSCL Long Beach                      | VRCZ7     | 32    | 0      | 5.9   | 1.2   | <a href="#">QC plot</a> |
| GB                   | Eridge                               | ZCBH7     | 35    | 0      | 9.1   | 1.5   | <a href="#">QC plot</a> |
| RU                   | BORIS SYROMYATNIKOV                  | UCUF      | 51    | 35     | 2.4   | 7.0   | <a href="#">QC plot</a> |
| RU                   | ELENA SHATROVA                       | UITR      | 28    | 0      | -6.0  | 2.3   | <a href="#">QC plot</a> |
| RU                   | OLEG NAIDENOV                        | UCUC      | 34    | 0      | -5.1  | 1.9   | <a href="#">QC plot</a> |
| US                   | CARNIVAL SENSATION                   | C6FM8     | 25    | 0      | -5.4  | 2.3   | <a href="#">QC plot</a> |
| US                   | HOOD ISLAND                          | C6LU4     | 63    | 0      | -4.9  | 1.6   | <a href="#">QC plot</a> |
| US                   | INDIANA HARBOR                       | WXN3191   | 28    | 36     | -8.8  | 4.9   | <a href="#">QC plot</a> |
| TEMPERATURE (deg C)  |                                      |           |       |        |       |       |                         |
| CTRY CODE            | SHIP NAME                            | CALL SIGN | TOTAL | GE (%) | BIAS  | SD    | Graph                   |
| AU                   | NORTHWEST SANDERLING                 | VNVZ      | 24    | 42     | 0.0   | 0.9   | <a href="#">QC plot</a> |
| CA                   | ARCTIC                               | VCLM      | 70    | 0      | 4.6   | 1.4   | <a href="#">QC plot</a> |
| NO                   | FF JAN MAYEN                         | LAHV      | 70    | 0      | 4.5   | 4.2   | <a href="#">QC plot</a> |
| RU                   | BORIS SYROMYATNIKOV                  | UCUF      | 51    | 0      | -5.9  | 4.4   | <a href="#">QC plot</a> |
| US                   | AURORA                               | WYM9567   | 154   | 0      | 5.4   | 2.6   | <a href="#">QC plot</a> |
| US                   | INDIANA HARBOR                       | WXN3191   | 28    | 11     | -9.7  | 5.0   | <a href="#">QC plot</a> |
| US                   | KOTA JAYA                            | VRWM2     | 22    | 0      | 4.7   | 5.5   | <a href="#">QC plot</a> |
| US                   | VALDEZ STAR                          | WCO7674   | 71    | 7      | 7.7   | 2.9   | <a href="#">QC plot</a> |
| WIND SPEED (m s-1)   |                                      |           |       |        |       |       |                         |
| CTRY CODE            | SHIP NAME                            | CALL SIGN | TOTAL | GE (%) | BIAS  | SD    | Graph                   |
| GB                   | Chiquita Deutschland                 | C6KD8     | 34    | 0      | 6.8   | 2.3   | <a href="#">QC plot</a> |
| NL                   | APOLLOGRACHT                         | PCSV      | 44    | 34     | 0.4   | 2.3   | <a href="#">QC plot</a> |
| US                   | BERLIAN EKUATOR                      | HPYK      | 28    | 71     | 5.1   | 5.4   | <a href="#">QC plot</a> |
| US                   | INDIANA HARBOR                       | WXN3191   | 28    | 0      | -7.0  | 4.4   | <a href="#">QC plot</a> |
| US                   | KNORR (AWS)                          | NWS0029   | 120   | 0      | -7.9  | 2.1   | <a href="#">QC plot</a> |
| US                   | OCEANUS (AWS)                        | NWS0028   | 67    | 0      | -6.0  | 1.6   | <a href="#">QC plot</a> |
| WIND DIRECTION (deg) |                                      |           |       |        |       |       |                         |
| CTRY CODE            | SHIP NAME                            | CALL SIGN | TOTAL | GE (%) | BIAS  | SD    | Graph                   |
| AU                   | FLORENCE                             | V2BF1     | 21    | 5      | -49.3 | 78.1  | <a href="#">QC plot</a> |
| GB                   | British Ruby                         | 2AKI2     | 21    | 0      | 31.8  | 59.0  | <a href="#">QC plot</a> |
| GB                   | Chiquita Deutschland                 | C6KD8     | 31    | 0      | -38.0 | 97.7  | <a href="#">QC plot</a> |
| GB                   | Ruby Princess                        | ZCDY2     | 215   | 2      | 24.6  | 105.0 | <a href="#">QC plot</a> |
| GB                   | Wren Arrow                           | C6JD7     | 33    | 0      | 13.9  | 86.3  | <a href="#">QC plot</a> |
| NL                   | APOLLOGRACHT                         | PCSV      | 35    | 43     | 50.1  | 118.5 | <a href="#">QC plot</a> |
| NL                   | POLAR STREAM                         | DDBR2     | 37    | 0      | -32.4 | 52.7  | <a href="#">QC plot</a> |
| NZ                   | TASMAN CHALLENGER (ANTIGUA AND BARB) | V2BE4     | 23    | 0      | -14.7 | 93.4  | <a href="#">QC plot</a> |

## ANNEX B

### Monthly monitoring criteria

#### Parameters monitored:

TOTAL: Number of observations received, excluding duplicates.

GE: Percentage of observations with gross errors.

BIAS: Mean O-B values, excluding those with gross errors.

SD: Standard deviation of O-B values, excluding those with gross errors.

(Note: A positive direction bias indicates the wind observation is veered to the background.)

#### Gross Error limits:

15 hPa (pressure)

15 degrees (air temperature)

15 ms<sup>-1</sup> (wind speed)

150 degrees (wind direction)

25 ms<sup>-1</sup> (vector wind)

60 % (relative humidity)

10 degrees (sea surface temperature)

#### Selection Criteria:

NOBS  $\geq$  20, and one or more of the following:

1. |bias|

$\geq$  4 hPa (pressure)

$\geq$  4 degrees (air temperature)

$\geq$  5 ms<sup>-1</sup> (wind speed)

$\geq$  30 degrees (direction)

$\geq$  15% (relative humidity)

$\geq$  3 degrees (sea surface temperature)

2. SD

$\geq$  6 hPa (pressure)

$\geq$  6 degrees (air temperature)

$\geq$  80 degrees (direction)

$\geq$  25% (relative humidity)

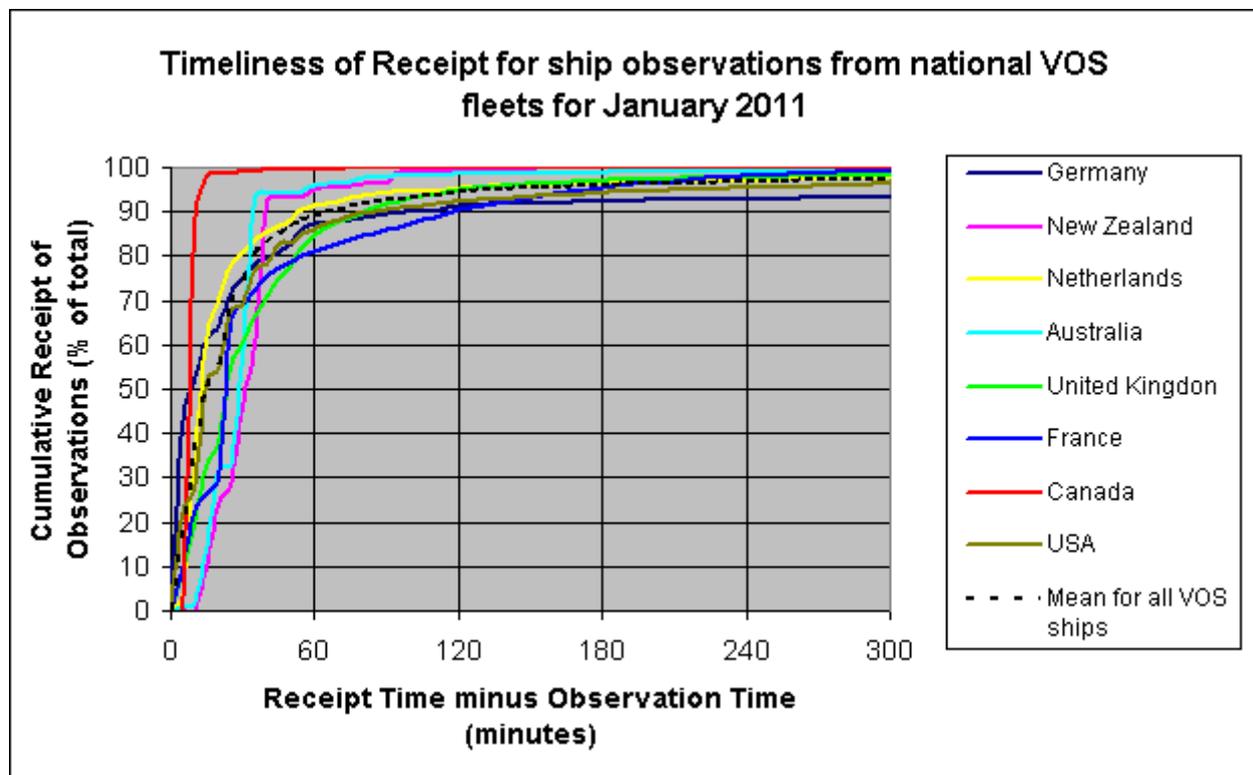
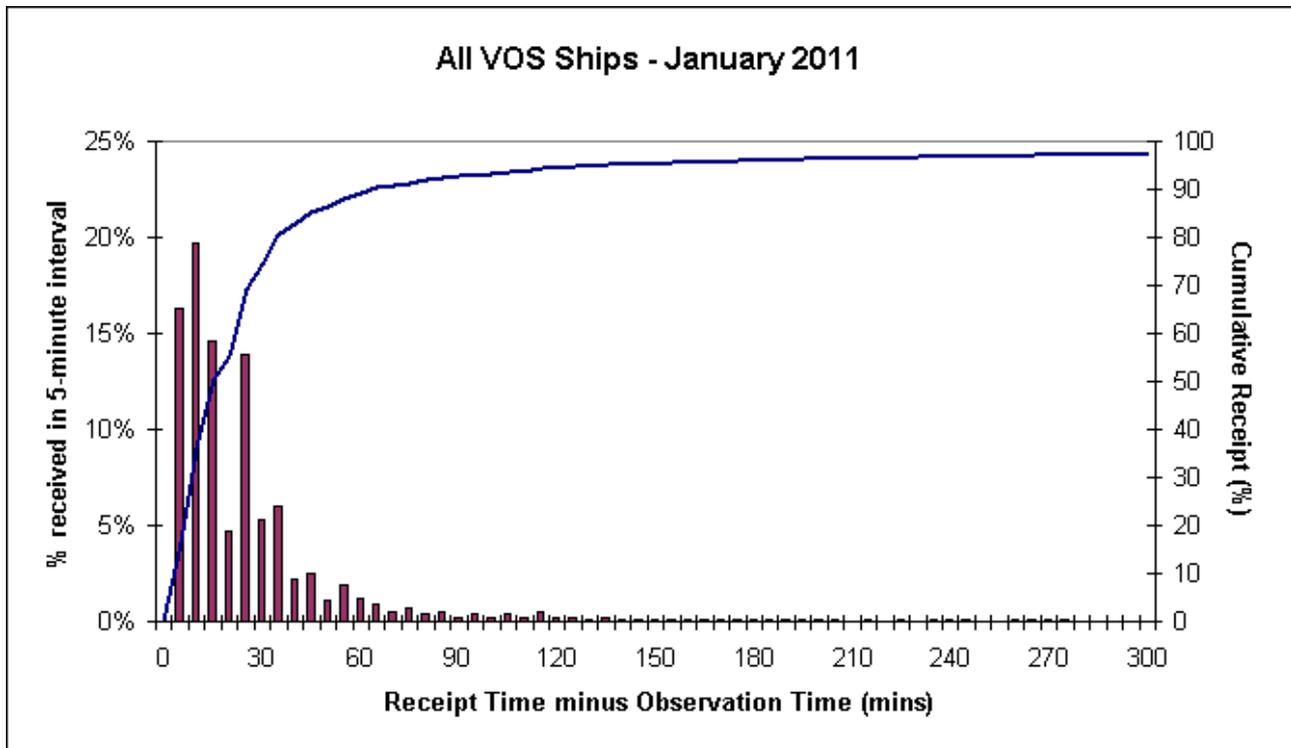
$\geq$  5 degrees (sea surface temperature)

3. %GE  $\geq$  25 %

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed  $>$  5 ms<sup>-1</sup>

## ANNEX C

### EXAMPLE OF MONTHLY TIME OF RECEIPT STATISTICS



## ANNEX D

### VOSClim monthly monitoring criteria for suspect ships

1. For each ship and each variable there should be at least 20 reports during the period (if there are fewer reports the statistics may be unreliable and no action is needed).

2. Then, either:

a) The number of gross errors should exceed 10% of the number of observation reports (where the observation-background (o-b) limits for individual gross errors are shown in column 4 of the following table); or,

b) One of the limits shown in columns 2 and 3 in the table should be exceeded for either:

(i) the mean value of o-b over the period (absolute value), or

(ii) the standard deviation of o-b over the period

| (1)<br>Variable                   | (2)<br>Mean o-b<br>limit | (3)<br>Std. Dev. o-<br>b limit | (4)<br>Gross<br>error<br>limit |
|-----------------------------------|--------------------------|--------------------------------|--------------------------------|
| Pressure (hPa)                    | 2.5                      | 5.0                            | 15.0                           |
| Wind speed (m/s)                  | 5.0                      | 10.0                           | 25.0                           |
| Wind direction (degrees)          | 30.0                     | 60.0                           | 150.0                          |
| Air Temperature ( $^{\circ}$ C)   | 2.0                      | 4.0                            | 10.0                           |
| Relative humidity (%)             | 12.0                     | 20.0                           | 50.0                           |
| Sea surface temp. ( $^{\circ}$ C) | 2.0                      | 4.0                            | 10.0                           |

3. If either of the limits on o-b statistics in columns 2 and 3 are exceeded the project ship's observations will be considered 'suspect' and corrective action may need to be taken (e.g. by the Port Met Officers). Column 4 contains the o-b limits for each ship observation beyond which the observation will be regarded as a 'gross error'.