SOT ANNUAL REPORT FOR 2006

VOSCLIM REAL TIME MONITORING CENTRE (RTMC) REPORT

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This document provides information on the data quality monitoring conducted by the VOSClim Real Time Monitoring Centre (RTMC) since SOT-III in 2005.

Introduction

1   The Met Office agreed to act as the Real Time Monitoring Centre (RTMC) for the project at the second meeting of the VOS Climate Project (VOSClim-II).

2   In accordance with the Terms of Reference agreed for the RTMC, the observed project variables (i.e. pressure, air temperature, relative humidity, sea surface temperature, wind speed and wind direction) are extracted from the GTS for each project ship and co-located with the associated model field values prior to transfer to the Data Assembly Centre (DAC). In addition, ship monitoring statistics are produced by the RTMC and provided to the DAC on a monthly basis, with statistics for 'suspect' ships being sent to the national focal points.

3   Further information and details of progress made by the RTMC since the last project meeting are given below.

Monitoring Statistics

4   At the last project meeting (SOT-III/VOSClim-V) it was agreed to keep the values for the real time monitoring of the observed variables at the levels given in **Annex A** to this report.

5   Since the SOT-III/VOSClim-V meeting:

- The RTMC has continued to update its list of project ships, following notification of changes to the list of project ships maintained on the VOSClim website.

- In accordance with the agreement at SOT-III (III-B/2.1.2), the RTMC has modified its software to only include those ship reports made over model sea points in the statistics used for deciding whether a ship is 'suspect'. However, the complete monthly statistics sent to the DAC still include all ship reports, including those from model land points (otherwise some ships that regularly report close to land would not appear in the list of statistics). The meeting is invited to comment on whether they wish the RTMC to modify its monthly statistics supplied to the DAC to exclude ship reports made at model land points.

- The RTMC has replaced the sending of the monthly statistics and suspect lists to the DAC by e-mail with placement on the Met Office's external FTP server, ready for the DAC to download.

- The RTMC has recently stopped producing monthly statistics for the list of prospective (or candidate) ships held on the project web site. This has been done because the list has not changed in two years and appears to be of little use in recruiting new ships. As the project is now nearing its initial target of 200 ships, it is suggested that there is no longer a need to monitor these candidate ships and suggested that the list can now be deleted from the VOSClim website.

- Due to major changes in the software used in the monitoring of data at the Met Office, the RTMC has had to modify its monitoring statistics. The normalised standard deviation and the 'true bias' can no longer be calculated and have been removed from the 4 variables for which they were previously produced. This has had the side effect of simplifying

the system and should reduce confusion among PMOs about the different criteria.

6   The RTMC now produces the following monitoring statistics for project ships:

- **Monthly Ship Statistics** – As mentioned above, a list of monitoring statistics for all participating project ships is put on to the Met Office external FTP server on a monthly basis, ready for the DAC to retrieve for inclusion on the project web-site. A recent example of these statistics, for January 2007, is given in **Annex B** (pressure only, to save space).

- **Monthly 'Suspect' List** - A list of monitoring statistics for project ships identified as having submitted 'suspect' observations, is sent to the project focal point in each participating National Met. Service (NMS) on a monthly basis. A copy of the list is also put on to the Met Office external FTP server, ready for the DAC to retrieve for inclusion on the project web site. The suspect lists are based upon the criteria established for the six observed variables (in **Annex A**). The lists should enable VOSCLim Focal Points and their associated PMO networks to resolve any quality problems. A recent example of the suspect list, for January 2007, is given in **Annex C.**

7   In order to ensure that the monitoring process operates effectively it is essential that:

- National focal points to whom the monitoring statistics are to be disseminated are clearly identified, with e-mail addresses kept up to date on the project web site.

- The call signs of ships participating in the project are maintained up to date on the project web-site, as this list is used as the basis for generating monitoring statistics. It would be helpful if updates to this list could also be copied to the RTMC.

8   On the basis of almost 5 years of monitoring, the RTMC considers that most of the criteria for the real time monitoring (in **Annex A**) have been set at approximately the correct levels. The exception may be the bias limit for relative humidity, which seems to be slightly low. The meeting is asked to consider whether a slightly higher limit of 12% or 15% may be more appropriate (the RTMC favours 12%).

9   At previous VOSClim meetings it was suggested that details of any remedial action taken by the PMOs in response to the monitoring information should be sent to the DAC via national focal points. The information could then be made available through the project web-site in order to avoid duplication of effort by PMOs in other countries who may be intending to visit a suspect project ship. Unfortunately, due possibly to pressures on PMO workloads, this does not appear to have been happening. By recording such actions it should be easier to pre-empt such problems from recurring in the future, whilst at the same time allowing an analysis of the type of problems being encountered to be made. The meeting is therefore invited to further consider whether details of remedial actions taken should be made available and how this could best be achieved.

Data Transfer

10   The RTMC is also responsible for ensuring the transfer of project ships' observations, and the associated co-located model data, to the DAC.

11   From April 2003 the Met Office has produced the VOSClim BUFR data on a daily basis and transmitted it to Washington via the GTS, from where it is sent on to the DAC.

12   Work has begun on putting a backup copy of the daily VOSClim BUFR data onto the Met Office's operational external FTP server, to be available for the DAC to access in case of problems with the GTS data. This work has been delayed somewhat due to the Met Office changing its external FTP server system.

13   The 47 elements included in the BUFR messages have not changed since they were agreed

at VOSClim-III in January 2002. For ease of reference the list is attached at **Annex D**.

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ANNEX A

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) Variable	(2) Mean o-b limit	(3) Std. Dev. o-b limit	(4) Gross error 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 (^{0} C)	2.0	4.0	10.0
Relative humidity (%)	10.0	20.0	50.0
Sea surface temp. (^{0} 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 will 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'.

ANNEX B

MONITORING STATISTICS FOR VOSCLIM SHIPS FOR JANUARY 2007

Standard of comparison: 6-hour forecast (background) from the Met Office Global NWP Model.
Column headings:
CallSign   - Ship's call sign.
NumObs   - Number of observations from each ship received during the period of the report.
%GrEr   - Percentage of observations with 'gross errors' (excluded from the statistics).

Bias   - Mean value of the observation-minus-background (o-b) values.
RMS   - Root mean square of the o-b values.
StdDev   - Standard deviation (SD) of the o-b values.

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                    Pressure (hPa)

  CallSign     NumObs     %GrEr     Bias      RMS    StdDev

   8PNK          17        0.0      1.5       2.3     1.7
   9KWH          43        0.0      0.2       0.6     0.6
   9KWP          15        0.0      0.2       0.5     0.5
   A8CN8         21        0.0      0.6       1.0     0.8
   A8ET9         24        0.0      2.0       2.1     0.6
   C6IZ7         14        0.0     -1.3       3.0     2.7
   C6KD5         51        0.0     -0.7       3.1     3.0
   C6KD6         53        0.0     -0.0       1.9     1.9
   C6KD7         77        1.3      1.0       2.2     2.0
   C6SS3         45        0.0     -0.7       2.0     1.9

   CG2958       434        0.0      0.6       1.1     0.9
   CGDS         238        0.0      0.5       0.9     0.7
   CGJK         233        0.0      0.2       0.9     0.9
   CGTF          58        0.0     -0.5       1.2     1.1
   DGHX          26        0.0      0.5       1.1     1.0
   DGXS          25        0.0      0.2       0.6     0.6
   DQVH          46        0.0     -0.1       1.0     1.0
   DQVI          27        0.0     -0.8       2.2     2.1
   DQVJ          20        0.0     -1.8       2.3     1.5
   DQVK          43        0.0     -0.6       0.9     0.7

   DQVL          51        2.0      0.4       1.0     0.9
   DQVM          36        0.0     -0.6       1.2     1.0
   DQVN          63        0.0     -0.5       0.9     0.7
   DQVO           8        0.0     -0.1       0.7     0.7
   ELXS8         75        0.0      0.3       1.0     1.0
   ELXT8         28        0.0     -0.9       1.3     0.9
   ELZU8         52        0.0      1.2       1.4     0.7
   FNCI           5        0.0     -0.5       0.7     0.5
   FNCM         153        0.0      1.2       1.3     0.4
   FNJI         109        0.0      0.4       0.8     0.7

   GBQM          10        0.0      2.5       3.8     2.8
   GBTT          37        0.0      1.0       2.6     2.4
   IBPW          25        0.0      1.0       1.3     0.9
   JCCX         166        0.0      0.2       0.8     0.8
   JDWX         141        0.0      0.0       0.7     0.7
   JGQH         307        0.0     -0.1       0.6     0.6
   JIVB         204        0.0      0.0       0.6     0.6
   JPBN         348        0.0      0.3       0.7     0.6
   MHCQ7         31        0.0     -0.1       1.2     1.2
   MHMZ8          9        0.0     -1.3       2.1     1.7

   MLBB4         15        0.0      0.5       0.8     0.6
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MQEC7        52    0.0    -0.2    0.6    0.6
MXBC6         6    0.0    -0.5    1.2    1.1
MXMM5        28    0.0     0.0    0.8    0.8
MYJM3        17    0.0     1.2    2.0    1.6
MYSU5        35    0.0    -0.0    1.6    1.6
MZER8        46    0.0    -0.5    1.1    1.0
MZFC6        39    0.0     0.2    0.6    0.6
MZGK7        19    0.0    -0.3    0.6    0.5
MZIM8        35    0.0    -0.5    1.5    1.4

ONDB         21    0.0    -0.8    1.4    1.1
OVSB2        24    0.0    -0.6    1.4    1.3
OVZV2        19    0.0     0.0    0.6    0.6
OYYK2        16    0.0    -0.3    0.9    0.9
OYYL2        23    0.0    -0.8    1.2    0.9
PCHS          9    0.0     0.1    1.4    1.4
PDHO         48    0.0    -2.7    2.8    0.9
PDHP         11    0.0     0.7    1.1    0.9
PDZS         64    0.0    -0.5    2.1    2.0
PECS         30    0.0    -0.6    0.9    0.7

S6TS         34    0.0     0.4    0.8    0.7
V2FM         21    0.0     0.2    0.9    0.9
VCLM        191    0.0    -0.2    1.2    1.2
VMAL         14    0.0     0.4    3.2    3.2
VNNM         37    0.0     0.4    1.0    0.9
VOCJ        221    0.0    -0.0    0.8    0.8
VQBW2        19    0.0    -0.4    1.1    1.0
VQGB2        26    0.0     0.1    1.1    1.1
VTXG         27    0.0     2.1    2.5    1.3
VTXK         68    0.0     6.5    6.7    1.5

VVGQ         16    0.0    -0.5    1.0    0.9
VVJV          9    0.0     2.0    2.6    1.7
VWNS          9    0.0     0.9    1.6    1.3
VWXG         12    0.0    -0.3    0.6    0.5
WCX8812      39    0.0    -1.3    1.6    0.9
WCX8882      24    0.0     0.6    1.1    0.9
WCX8884      27    0.0    -0.9    1.5    1.2
WFLG         58    0.0    -2.3    2.6    1.3
WNDP         18    0.0    -1.5    2.3    1.8
WRYC         27    0.0    -1.7    1.9    0.9

WRYD         15    0.0    -1.6    2.9    2.4
ZCBD3        27    0.0     1.0    1.3    0.8
ZCBN5        26    3.8     0.2    0.8    0.8
ZCDH7        23    0.0     0.6    3.3    3.2
ZDLP         50    0.0    -0.1    1.0    1.0
ZDLS1        52    0.0     0.2    0.9    0.9
ZNQO3         9    0.0    -0.0    1.8    1.8
ZQAY4        63    0.0    -2.1    2.9    2.0
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ANNEX C

VOSCLIM SHIP SUSPECT LIST FOR JANUARY 2007

All VOSClim ship data is monitored against background 6-hour forecast fields for all variables except SST, for which analysed fields from the previous day are used.

 Key to table below

NumObs   :   number of observations (obs) from the ship during the month
%GE   :   percentage of obs with gross errors (for GE limits see below)
StdDvn   :   standard deviation of obs-background, excluding obs with gross errors
Bias   :   mean obs-background, excluding obs with gross errors
RMS   :   root mean square of obs-background, excluding obs with gross errors

Suspect selection criteria for each variable:
      at least 20 observations from the ship and one or more of the following:-

%GE	>	10%
|Bias|	>	Bias limit (see below)
StdDvn	>	StdDvn limit (see below)

Limits:	Press. (hPa)	Wind Speed (m/s)	Direct. (deg)	Air Temp. (deg C)	Rel.Hum. (%)	SST (deg C)
Bias limit	2.5	5	30	2.0	10	2.0
StdDvn limit	5.0	10	60	4.0	20	4.0
GE limit	15.0	25	150	10.0	50	10.0

Callsign	Element	NumObs	%GE	StdDvn	Bias	RMS
PDHO	Press	48	0	0.9	-2.7	2.9
VTXK	Press	68	0	1.5	6.5	6.7
VCLM	Speed	35	11	4.8	4.1	6.3
VTXK	Speed	63	0	3.0	7.4	8.0
ZDLP	Speed	50	14	2.4	0.5	2.5
CGJK	Temp	233	0	1.5	4.1	4.3
PDZS	Temp	63	0	2.2	2.3	3.2
CGJK	RelHu	233	0	8.8	-10.7	13.8
C6SS3	RelHu	45	0	5.6	12.5	13.7
ELXT8	RelHu	28	0	14.0	20.0	24.4
IBPW	RelHu	25	0	7.5	17.1	18.6
PDZS	RelHu	62	0	12.6	-13.0	18.1
VOCJ	RelHu	221	0	8.2	-10.5	13.3
VTXG	RelHu	27	0	9.8	10.0	14.0
ZCBN5	RelHu	25	0	6.1	10.4	12.0
DQVN	SST	65	0	0.6	2.1	2.2
VOCJ	SST	39	0	2.4	3.3	4.1

ANNEX D

BUFR CODE TEMPLATE

CALL_SIGN
LTTD
LNGD
YEAR
MNTH
DAY
HOUR
MINT
COLTN_CNTR
BLTN_IDNY
MSL_PESR
SRFC_WIND_SPED_RCRDG_IDNY
SRFC_WIND_DRCTN
SRFC_WIND_SPED
SRFC_WIND_U
SRFC_WIND_V
SRFC_AIR_TMPR
WET_BULB_RCRDG_IDNY
WET_BULB_TMPR
SRFC_DEW_PONT_TMPR
SRFC_RLTV_HUMDY
HRZL_VSBLY
CRNT_WTHR_TYPE
PRMY_PAST_WTHR_TYPE
TOTL_CLOD_AMNT
LWST_CLOD_AMNT
LWST_CLOD_BASE_HGHT
LOW_CLOD_TYPE
MEDM_CLOD_TYPE
HIGH_CLOD_TYPE
Q3HOUR_SHIP_DRCTN
Q3HOUR_SHIP_SPED
SEA_SRFC_TMPR_RCRDG_IDNY
SEA_SRFC_TMPR
BCKD_YEAR
BCKD_MNTH
BCKD_DAY
BCKD_HOUR
BCKD_FRCT_LNGH
MODL_SRFC_TYPE
MODL_SRFC_HGHT
BCKD_MSL_PESR
BCKD_SRFC_WIND_U
BCKD_SRFC_WIND_V
BCKD_SRFC_AIR_TMPR
BCKD_SRFC_RLTV_HUMDY
BCKD_SEA_SRFC_TMPR