REGIONAL SPECIALIZED METEOROLOGICAL CENTRE (RSMC), EXETER
VOS MONITORING REPORT FOR 2008
(Submitted by Colin Parret, RSMC Exeter)

1   The Met Office (RSMC Exeter) Continues to produce monitoring lists of suspect ship observations each month, which are sent to the WMO Secretariat. Since 2005, they have also been available via the Met Office web site[1] at:

http://www.metoffice.gov.uk/research/nwp/observations/monitoring/index.html

2.   A recent example of the on-line VOS suspect list for January 2009 is shown in Annex A. The current monthly monitoring criteria are shown in Annex B.

3   The Met Office also produces monthly lists of monitoring statistics for all VOS. To maintain up to date lists of ships, the Met Office has recently started to download the latest Pub47 meta-data for European and Australasian fleets from the E-SURFMAR metadata database web site. It would be helpful to the Met Office if the latest Pub47 metadata for all country's VOS fleets were available for download from this site, considering the rather late updates to the WMO Pub 47 meta-data (at the time of writing the WMO Pub47 list was 11 months out of date).

4   The lists of VOS monitoring statistics available on the Met Office web site have been modified since the fourth SOT Session (Geneva, April 2007) to remove the country identifier for those ships with unique masked call signs (the ship name is also omitted). Since SOT-IV a facility has been added to download the VOS statistics as an MS Excel file.

5.   Timeliness information for VOS reports received at the Met Office is also available from the web site[1] at:

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

6   An example for January 2009 is also shown in Annex C where the upper graph shows that the majority of ship reports continue to be received promptly, with over 60% received within 30 minutes and 90% within 90 minutes of the observation time (an early data cut-off time for operational NWP is 90 minutes after analysis time). Timeliness information for individual ships is also available from the website and an extract is shown at Annex D.

7   The (Japanese) SHIP masking scheme implemented in December 2007 prevents the Met Office from monitoring individual Japanese and some US ships. Since the fourth SOT Session, the Met Office has set up special collection of the data with real call-signs from JMA's FTP server, but currently this data is not available for monitoring purposes as it has not been routed into the Meteorological database due to staff shortage and 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 to choose one that assigns a unique identifier for each ship.

8   The Met Office has recently set up a scheme for ranking the UK VOS fleet in terms of quantity, timeliness and quality of reports from each ship, to assist in presenting awards to the best performing ships. The scheme is detailed in Annex E.

_____

1: During 2008, the Met Office introduced password protection to its web site, but it is straightforward to obtain a login and password to gain access to the site by following the online instructions.

ANNEX A

MET OFFICE ON-LINE VOS SUSPECT LISTS FOR JAN 2009
(first page)

► 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 2009

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.

PRESSURE (hPa)

CTRY CODE	SHIP NAME	CALL SIGN	TOTAL	GE (%)	BIAS	SD	Graph
CA	SAMUEL RISLEY	CG2960	216	100	0.0	0.0	QC plot
DE	CAP SAN MARCO	ELZA9	23	0	4.2	1.6	QC plot
DE	CMA CGM OCEANO	A8IT6	39	0	5.9	1.3	QC plot
DE	CONTI GERMANY	A8MQ3	75	0	5.0	1.5	QC plot
DE	LARCH ARROW	V2BR5	31	0	-6.4	1.1	QC plot
DE	MONTE AZUL	DFTH2	45	0	-6.4	1.9	QC plot
DE	MSC GEMMA	DBUT	26	8	5.5	2.3	QC plot
DE	RIO DE JANEIRO	DDID2	54	0	-4.8	2.2	QC plot
MY	TENAGA DUA	9MSM	36	6	-4.6	3.2	QC plot
RU	IVAN SUSANIN	UCJL	27	0	-5.6	2.5	QC plot
US	ALBEMARLE ISLAND	O6LU3	35	0	5.5	1.5	QC plot
US	HUGO N	HPNV	130	48	-8.7	5.2	QC plot
US	LNG ARIES	V7BW7	44	0	4.4	1.2	QC plot
US	LNG CAPRICORN	V7BW8	47	0	4.5	2.0	QC plot
US	NORWEGIAN JEWEL	O6TX6	22	0	-6.8	1.8	QC plot
US	POLAR STAR	8PPK	45	24	7.7	3.9	QC plot
US	TALISMAN	LAOW5	22	32	4.0	3.1	QC plot
US	TYCO DURABLE	V7DI8	32	0	7.1	1.2	QC plot

TEMPERATURE (deg C)

CTRY CODE	SHIP NAME	CALL SIGN	TOTAL	GE (%)	BIAS	SD	Graph
DE	COSCO LONG BEACH	A8HG2	32	0	5.1	2.3	QC plot
SE	ATL CONVEYOR	SCKM	39	0	-4.5	5.2	QC plot
US	BRUCE	WWU8	103	32	3.6	3.4	QC plot
US	NORWEGIAN JEWEL	O6TX6	22	9	-10.7	2.1	QC plot

WIND SPEED (m s-1)

CTRY CODE	SHIP NAME	CALL SIGN	TOTAL	GE (%)	BIAS	SD	Graph
AU	NORTHWEST SANDERLING	VNVZ	49	0	-5.7	3.3	QC plot
DE	HANJIN YANTIAN	DDYZ2	95	1	5.6	3.7	QC plot
DE	HEINCKE	DBCK	344	0	-5.2	2.2	QC plot
DE	LILY OLDENDORFF	A8AY3	49	14	8.3	3.5	QC plot

ANNEX B

MONITORING CRITERIA FOR PRODUCING MONTHLY MARINE SUSPECT LISTS

```
Monitoring procedures

Period                  :One calendar month.
Data monitored          :Reports from each unique identifier for ships,
                         fixed buoys and platforms.
Standard of comparison  :Background field from Exeter global model.
Observation times       :All hours
Elements monitored      :Mean sea level pressure (hPa).
                        :Wind speed (ms⁻¹).
                        :Wind direction (degrees).
                        :Air temperature (°C).
                        :Relative Humidity (%).
                        :Sea surface temperature (°C).
Parameters monitored
     NOBS               :Number of observations received, excluding duplicates.
     %GE                :Percentage of observations with gross errors.
     %REJ               :Percentage of observations flagged, excluding
                         those with gross errors.
     SD                 :Standard Deviation of difference of observation from
                         background values, excluding those with gross errors.
     BIAS               :Mean difference of observations from
                         background values, excluding those with gross errors
                         (N.B. a positive direction bias indicates the wind
                         observation is veered to the background).
     RMS                :Root Mean Square difference of observations from
                         background values, excluding those with gross errors.


GROSS ERROR LIMIT       :15 hPa      (pressure)
                        :25 ms⁻¹     (vector wind)
                        :15 °C       (air temperature)
                        :50%         (relative humidity)
                        :10 °C       (sea surface temperature)

SELECTION CRITERIA      :NOBS >= 20 , and one or more of the following:

                        1.Bias   >=       4 hPa        (pressure)
                                 >=       5 ms⁻¹       (wind speed)
                                 >=       30 degrees   (direction)
                                 >=       4 °C         (air temperature)
                                 >=       15%          (relative humidity)
                                 >=       3 °C         (SST)
                        2.SD     >=       6 hPa        (pressure)
                                 >=       80 degrees   (direction)
                                 >=       6 °C         (air temperature)
                                 >=       25%          (relative humidity)
                                 >=       5 °C         (SST)
                        3.PGE    >=       25

N.B. Observations of wind direction are only included in the wind direction
statistics if the observed OR background wind speed > 5 ms⁻¹…
```
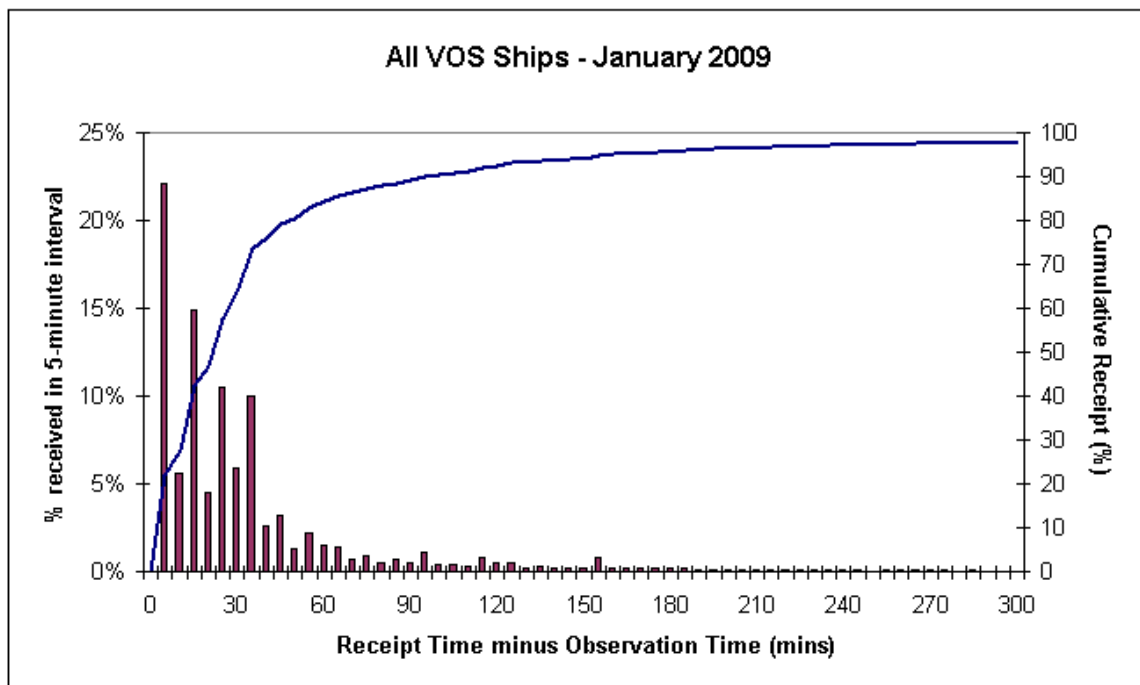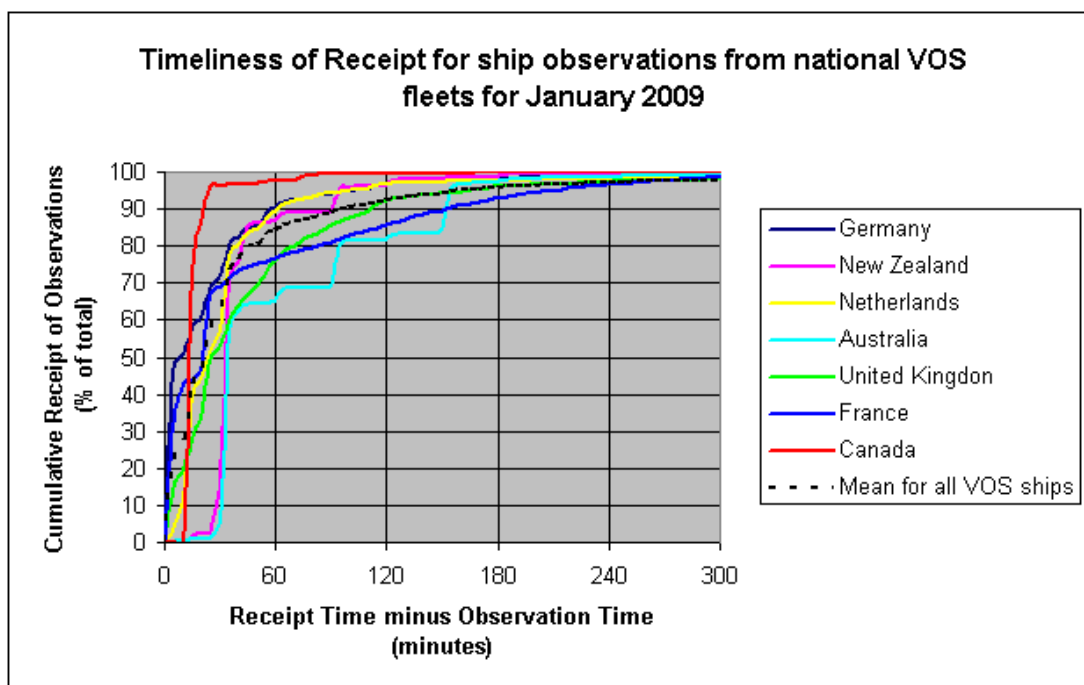
_____

ANNEX C

TIMELINESS OF VOS OBSERVATIONS RECEIVED AT THE MET OFFICE (UK), JAN 2009

The timeliness of observations from some of the individual national fleets involved in VOS are also presented below.

ANNEX D

Pub47 Time of Receipt Statistics by SHIP for January

CTRY	CALLSIGN	NAME	Observations	N<30	N<60	N<120	N>360	Average (R-O) (mins)
	B2M0038		24	3	22	24	0	33.8
	B2M1297		13	0	10	13	0	39.0
	B2M1303		6	0	5	6	0	41.7
AU	VJD2969	ABURRI	5	0	1	3	0	97.4
AU	9KKS	AL KUWAIT	58	2	15	24	10	174.1
AU	9KWH	AL MESSILAH	70	3	22	29	19	210.9
AU	9KWP	AL SHUWAIKH	18	1	10	16	1	66.2
AU	PHIN	AMAZONEBORG	20	1	16	19	0	45.0
AU	2ALD3	ANL WANGARATTA	37	2	37	37	0	32.3
AU	9V7548	ANL WARRAIN	3	0	1	3	0	71.0
AU	2AJU5	ANL WYONG	19	1	11	16	0	59.9
AU	V2BJ5	ANL YARRUNGA	227	17	220	221	0	36.2
AU	IBGF	BECRUX	6	0	4	5	0	52.7
AU	A8OK5	CAP BIANCO	6	2	5	5	1	116.0
AU	C4PN2	CAP BON	44	1	17	30	0	85.8
AU	DCGL2	CAP SARAY	56	43	55	56	0	17.3
AU	V7FN7	CAPE DELFARO	31	4	25	28	0	53.6
AU	V7CZ6	CAPE DELGADO	16	1	16	16	0	31.8
AU	V7IA5	CAPE MORETON	23	2	22	23	0	36.3
AU	J7AV7	CAPITAINE COOK	15	2	15	15	0	31.9
AU	A3BN5	CAPITAINE TASMAN	1	0	1	1	0	31.0
AU	5WDC	FORUM SAMOA II	26	2	25	26	0	33.3
AU	VMGO	GOLIATH	1	0	0	0	0	151.0
AU	ELTS6	GOONYELLA TRADER	112	10	86	110	0	42.4
AU	VROB	HIGHLAND CHIEF	226	16	219	222	0	35.4
AU	VNVR	IRON YANDI	228	17	221	224	0	35.3
AU	3EPI6	KAMAKURA	12	1	12	12	0	32.2
AU	V2OM6	KIMBERLEY ROSE	21	0	18	21	0	42.6
AU	VRRD	KOKOPO CHIEF	35	3	32	35	0	35.1
AU	FHZI	L\'ASTROLABE	674	18	225	441	0	27.8
AU	VMAL	LINDESAY CLARK	40	1	38	39	0	35.8
AU	ONDB	LOWLANDS PROSPERITY	30	0	27	28	0	42.2
AU	V2OW2	MSC FRISIA	37	1	11	24	0	97.2
AU	VNVZ	NORTHWEST SANDERLING	49	6	38	46	0	45.9
AU	VNVG	NORTHWEST SANDPIPER	14	0	13	14	0	35.4
AU	ZCAS2	NORTHWEST SEAEAGLE	23	4	21	21	0	41.7

———————————

ANNEX E

SCHEME FOR RANKING VOS SHIPS BY QUANTITY AND QUALITY OF REPORTS

1. The scheme analyses a year's worth of data for each ship, considering the following variables: pressure (P), wind speed (Spd), wind direction (Dir), air temperature(T), relative humidity (RH), log(visibility) (Vis) and sea surface temperature (SST). It then produces a score for each ship, with the lowest score being the best, based on the number of reports received (NumObsScore), their quality (QualityScore) and their timeliness (TorScore).

2. The numbers of reports received (NumObs) are 'capped' to limit the influence of any of the very high numbers from automatic stations, then the scheme calculates a score for the number of reports. Firstly the NumObs values are inversed to give low (good) scores to ships with high numbers of reports and vice-versa: NumObsInv = MAX(NumObs) − NumObs
Secondly, so that ships with below average numbers have scores greater than 1.0, and vice-versa, we set NumObsScore = NumObsInv / MEAN(NumObsInv).

3. The quality scores for each variable are based on observation minus background (O-B) values and the following three statistics:

   (i)   MeanScore = (Absolute value of mean O-B) / VariableLimit
   (ii)   SDScore   = (Standard Deviation of O-B) / VariableLimit [where the following VariableLimit values are used, based on Met Office reject list thresholds: P = 2.0hPa, Spd = 3.0m/s, Dir = 40°, T = 3.0 ^{o}C, RH = 15.0%, Log(Vis(m)) = 1.0, SST = 3.0^{o}C.]
   (iii)   GEScore = (Number of Gross Errors) / (Mean number of Gross Errors)

(N.B. For ships with 100% gross errors, the Mean and SD scores are set to the worst in the set.)

The above scores are capped at values of 2.0, then the quality score is created for each variable: QualityScore = (MeanScore + SDScore + GEScore) / 3

4. Time of receipt (ToR) scores are produced from yearly totals for the following ToR categories: Reports received within 30 minutes, 30-60 mins, 60-120 mins, 120-360 mins and after 360 mins. Each ship is given a score that is the sum of the following numbers of points multiplied by the numbers of observations in each category:

points_30 = 0.0, points_60 = 30.0, points_120 = 75.0, points_360 = 225.0, points_after = 345.0.

(These scores are just the values of the mid points of the ranges minus the mid-point of the first range (15 minutes) to make the best score zero. 'points_after' has just been set to 360-15, as the range is unbounded.)

   The ToR scores are then divided by the scores the ships would have received had all of their observations been received between 60 and 120 minutes, i.e. we are suggesting that observations should really have been received within two hours and that observations received later than that are less useful to NWP.

   The ToR scores are also capped at 2.0.

5. Originally, the NumObsScore, QualityScore and TorScore were combined with weights of 0.5, 0.25 and 0.25, respectively; however, after discussion with some of the UK PMOs it was decided to give less weight to ToR and NumObs and more weight to the Quality score. Consequently, weights of 0.4, 0.4 and 0.2 have now been set for NumObs, Quality and ToR, respectively.
   For ships that do not report certain variables the scores are set to the worst score for that variable (usually 2.0). Then the scheme combines the scores for each variable using the following relative

weightings: P = 2.0, Spd = 1.0, Dir = 0.6, T = 1.0, RH = 0.6, Vis = 0.4, SST = 1.0.
These weightings are estimates of the relative importance of each variable to the NWP models and their values may require further tuning.

_____