

REPORT ON THE REVIEW OF THE UTILISATION OF AMVS WITH NWP CENTRES

This working paper presents updated information about the operational usage of the satellite wind products at the NWP centres. The information is maintained and updated on the WWW by EUMETSAT, based on input from the NWP centres.

It is proposed that:

- CGMS Working Group III discusses whether other key criteria should be included in the information.

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1 INTRODUCTION

This working paper presents a summary of the usage of satellite tracked winds at different NWP centres. The paper is a one-to-one copy from the EUMETSAT WWW server at <http://www.eumetsat.de/en/area3/mpef/windsuse.html>.

The information consists of three parts. Table 1 summarises key selection parameters for the different NWP centres. Table 2 contains the observational errors assigned to the satellite winds by the NWP centres, with radiosonde errors given for comparison. After the tables there are details on the criteria for the selection/rejection of data from different satellites and for different geographical regions as performed by the individual NWP centres.

The last complete update of the information was performed in the second half of 1999. A new update is being started.

2 USAGE OF WIND PRODUCTS FROM GEOSTATIONARY SATELLITES AT MAJOR NWP CENTRES

The information provided in the tables below is taken from the EUMETSAT Internet site.

Since a working paper was presented to CGMS XXVII, the major evolution in the usage of AMVs for NWP has been the migration of ECMWF and Fleet Navy Meteorological to the usage of AMVs encoded with the WMO enforced BUFR tables. As this version of the tables is necessary for encoding quality information for individual AMVs, this migration is essential for an improved utilisation of AMVs. Other NWP centres are planning to follow this migration path. An important step will be the availability on the GTS later this year of GOES winds encoded in WMO enforced BUFR tables.

The information in these tables has been collected as a joint effort by ECMWF (Graeme Kelly) and EUMETSAT. Please provide feedback to Mikael Rattenborg at EUMETSAT (rattenborg@eumetsat.de) if any of the information is no longer up-to-date or if your NWP centre is missing. We would like to thank the NWP centres for their contributions and cooperation.

Table 1: Key selection parameters for satellite tracked winds at different NWP centres.

Centre	ECMWF	DWD (Germany)	NCEP (USA)	UKMO	Météo France	BoM (Australia)	CMC (Canada)	JMA (Japan)	US-Navy (NOGAPS)
SATOB monitored		x	x	x	x	x	x	x	
SATOB assimilated		x	x	x	x	x	x	x	
HRV simplified BUFR monitored	x			x	x			x	
HRV simplified BUFR assimilated	x			x	x				
<u>WMO Standard</u> <u>BUFR</u> monitored	x			x				x	x
<u>WMO Standard</u> <u>BUFR</u> assimilated	x								x
Assimilation Cycle (hrs)	4D-VAR	6	6	6	6	6	6	6	6
Additional Selection Criteria	<u>note</u>	<u>note</u>	<u>note</u>	<u>note</u>	<u>note</u>	<u>note</u>		<u>note</u>	<u>note</u>

Table 2: Observation errors in m/s assigned to satellite tracked winds at various NWP centres. Values pertain to u and v components. For comparison the first column gives the observation error of radiosonde winds as applied at ECMWF.

hPa	R/S	ECMWF	DWD (GER)	NCEP (US)			UKMO	Météo France			BoM (AUS)	CMC (Canada)	JMA (JP)	US-Navy (NOGAPS)	
				Current All Sat.	New GOES	New OTHER		Meteosat/ GOES	GMS	INSAT				All	high.- dens. CIMSS
1000	2.3	2	3	3.9	1.8	1.8	1.3	2.75	3.25	3.5	3		3	2.8	1.7
850	2.3	2	3				1.7	2.86	3.38	3.64	3		3	2.8	1.7
700	2.5	2	3				2.0	3.08	3.64	3.92	3		3	3.8	2.3
500	3.0	3.5	3	3.9	2.1	2.1	2.5	3.85	4.55	4.9	3		3	4.8	2.5
450				6.1	3	5					3		3.1		
400	3.5	4.5	6		3		3.3	4.29	5.07	5.46	6		3.21	5.8	3.5
300	3.7	5	6		3	5	3.3	4.62	5.46	5.88	6		3.48	6.5	3.9
250	3.5	5	6		3	5	3.3	4.84	5.72	6.16	6		3.65	6.5	
200	3.5	5	6		3	5	3.3	5.06	5.98	6.44	6		3.85	6.5	
150	3.5	5	6		3	5	3.6	5.06	5.98	6.44	6		4.12	6.5	
100	3.3	5	6		3	5	5.5	5.06	5.98	6.44	6		4.5	6.5	

Notes to Table:**ECMWF**

All data are monitored irrespective of passing or failing the data selection checks.

a) Check on longitude/latitude:

- Data are used only if within a circle of 55 degree from the sub-satellite point.

b) Checks on levels depending on the computational method or channel are as follows:

- The infrared CMW are used above 400 hPa and below 700hPa
- The water vapour CMW are used only above 400 hPa.
- The visible CMW are used only below 700 hPa.

c) Check on land/sea:

- Data over sea are always used.
- If data is over land, then it is used only if south of 20N and above 500 hPa (Meteosat-7: instead of 20°N a threshold of 35°N is used in order to allow usage of these data over North Africa. Meteosat-5: Used everywhere over land above 500 hPa, except over Himalaya, (25 < LAT < 40) and (70 < LON < 105).)

d) Check on satellite:

At present the following satellites and channels used are:

- METEOSAT IR (not at medium level), VIS, WV and HRVIS (not at asynoptic time).
- GOES IR & WV.
- GMS IR & VIS.

e) Additional thinning:

Before final assimilation all satellite winds are thinned to the following:

- One wind per box 1.25° x 1.25°.
- One per nearest model pressure level.

More details are provided at http://www.met-office.gov.uk/sec5/NWP/NWPSAF/satwind_report/ecmodel.html

German Weather Service (DWD)

a) Check on geographical area:

- Where available, except over land north of 20N and south of 20S.

b) Check on satellites:

- Winds from GOES, GMS and Meteosat are used.

c) Check on spectral band:

- IR, VIS and WV.

All winds are thinned before use to one observation in a box of 0.5/0.75 degrees latitude/longitude and 40 hPa.

NCEP

At NCEP satellite winds from GOES 8 and GOES 9 and Meteosat are used everywhere south of 20°N, and only over ocean north of 20°N. Satellite winds from Japan GMS are used everywhere.

UK Meteorological Office

Wind sets currently used: Meteosat-7 and Meteosat-5 IR, WV, VIS; GOES IR; GMS IR, VIS.

Standard IR and VIS wind use: everywhere, except over land north of 20N at low levels (less than 700 hPa).

Standard WV wind use: everywhere at high levels (above 400 hPa).

GOES high-density IR winds are thinned before use to one observation in a box of 2 degrees latitude/longitude, 200 hPa.

More details are provided at http://www.met-office.gov.uk/sec5/NWP/NWPSAF/satwind_report/ukmodel.html

Météo France

There is no a priori blacklisting except that winds are only used within a circle arc around the sub-satellite point, and between 50N and 50S.

All SATOB winds from Meteosat 5 and 7, GOES E, GOES W and GMS (IR, VIS and WV) are monitored and assimilated.

INSAT SATOB winds (IR) are monitored.

Australian Bureau of Meteorology

All GTS wind products from GOES, GMS and Meteosat are used. A special local wind data set is produced for the Australian region from GMS.

Japan Meteorological Agency (JMA)

Winds from GOES, GMS, and Meteosat are used, except if a radiosonde observation is available within 50km.

Observational errors for levels other than those provided in Table 1 are interpolated. Reported levels higher than 200 hPa are reassigned to 200 hPa.

Normal cloud track winds and water vapour track winds are processed in exactly the same way, since the quality of both data sets is almost the same.

US Navy Global (FNMOC/NOGAPS)

All the satellite winds decoded from the bulletins for GOES, GMS and Meteosat are used. In addition high-density multispectral wind observations produced by the University of Wisconsin-CIMSS from the GMS-5 and GOES-8 imagery are used. These observations are being used only from 40°S-40°N and are combined into superobs at an approximate resolution of 200 km. The observation errors assigned to these superobs are given in Table 2 in column 'high-dens. CIMSS'.

Remarks:

The information provided above is also available at the EUMETSAT Internet site at www.eumetsat.de/en/area3/mpef/windsuse.html. Additional detailed information regarding the usage of geostationary winds at the UK Met Office and ECMWF can be found at the Internet site of the Satellite Application Facility for Numerical Weather Prediction at http://www.met-office.gov.uk/sec5/NWP/NWPSAF/satwind_report/.