

## Upgrade of tracking algorithm for MTSAT-1R AMVs in September 2009

JMA plans to upgrade the tracking algorithm for Atmospheric Motion Vectors (AMVs) of MTSAT-1R from 06 UTC 15 September 2009. The upgrade of tracking algorithm improves accuracy of AMVs.

Table 1 shows monthly statistic of AMVs for MTSAT-1R against sonde observations for current and new AMVs(QI>0.85). With respect to IR and WV AMVs, the NUMBER of new AMVs is larger than that of current AMVs at all height levels for Northern and Southern Hemispheres, and Tropics. The MEAN SPEEDS of new AMVs are smaller than those of current AMVs, and the RMSVDs of new AMVs are slightly smaller than those of current AMVs. With respect to VIS AMVs, the same differences in NUMBER and MEAN SPEED between current version and new one are recognized for Northern and Southern Hemispheres, and Tropics. However, the magnitudes of the differences are relatively smaller than that for IR and WV AMVs.

The upgrade is the improvement of the accuracy of starting position of motion vector. The tracking algorithm of JMA's AMVs is pattern matching method by using cross-correlation coefficients. For reduction of processing time, pattern matching process is divided into coarser and finer matching. The coarser (resp. finer) matching is for larger (resp. smaller) scale motion vector.

The coarse matching approximately computes corresponding positions of target in successive coarse grained satellite images. Approximately estimated position by the coarser matching is refined by the finer matching. The finer matching exactly computes corresponding positions of target in successive satellite images with original resolution. A final motion vector is the sum of these two motion vectors by the coarser and the finer matching. The upgrade is the improvement of the accuracy of corresponding positions of these two motion vectors.

With the update of algorithm, AMVs with QI above 0.7 will be disseminated to users from 06 UTC 15 September 2009.

Table 1: Monthly statistics (MEAN SPEED, BIAS, RMSVD and NUMBER) of current AMVs and new AMVs (QI>0.85) against sonde observations. The statistical month is May 2009.

High level IR AMV (above 400hPa)	NH (20N-60N)		TR (20S-20N)		SH (60S-20S)	
	Current	New	Current	New	Current	New
MEAN SPEED (m/s)	29.07	26.50	14.39	12.10	33.36	30.28
BIAS (m/s)	-0.17	-0.51	-0.10	-0.27	0.39	0.12
RMSVD (m/s)	7.40	7.10	5.56	5.12	7.52	7.28
Number of AMVs	53480	70878	36342	65412	44402	55936

Middle level IR AMV (700 hPa ~ 400 hPa)	NH (20N-60N)		TR (20S-20N)		SH (60S-20S)	
	Current	New	Current	New	Current	New
MEAN SPEED (m/s)	19.11	16.85	19.60	13.43	21.67	18.95
BIAS (m/s)	-0.39	-0.72	1.40	0.57	0.01	-0.31
RMSVD (m/s)	6.33	6.05	6.70	5.52	7.88	7.28
Number of AMVs	9144	15375	1669	2927	21608	31794

Low level IR AMV (below 700hPa)	NH (20N-60N)		TR (20S-20N)		SH (60S-20S)	
	Current	New	Current	New	Current	New
MEAN SPEED (m/s)	9.69	8.27	8.86	7.91	11.38	10.28
BIAS (m/s)	0.10	-0.18	0.42	0.31	-0.05	-0.51
RMSVD (m/s)	3.98	3.85	3.13	2.98	4.15	3.94
Number of AMVs	8728	21627	15666	41172	37328	74125

Cloudy-region WV AMV (above 400hPa)	NH (20N-60N)		TR (20S-20N)		SH (60S-20S)	
	Current	New	Current	New	Current	New
MEAN SPEED (m/s)	31.56	29.33	15.64	13.61	36.18	33.14
BIAS (m/s)	1.62	1.27	0.90	0.73	2.20	1.96
RMSVD (m/s)	7.93	7.66	5.99	5.65	8.38	8.20
Number of AMVs	93937	120402	60252	106920	62925	78028

VIS AMV (below 700hPa)	NH (20N-60N)		TR (20S-20N)		SH (60S-20S)	
	Current	New	Current	New	Current	New
MEAN SPEED (m/s)	8.22	8.07	8.14	7.99	10.89	10.88
BIAS (m/s)	-0.46	-0.43	0.25	0.34	-0.28	-0.24
RMSVD (m/s)	4.21	4.26	2.83	2.88	4.07	3.93
Number of AMVs	9362	10258	13354	14741	24210	25293