

## REPORT FROM WORKING GROUP 1: METHODS

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### INTRODUCTION

This working group discussed several topics initiated by the co-chairs and from CGMS 37 recommendations to the 10<sup>th</sup> International Winds Workshop (IWW10). Although titled Methods, this was not the only focus of the group. Many topics were discussed, some in great detail, others very briefly. From these discussions, a set of recommendations has been produced. The recommendations are not in any order of importance.

### Tracking

A new approach to tracking was introduced at the 10<sup>th</sup> IWW by Jaime Daniels and Wayne Bresky. It was shown that an average motion of 5x5 AMVs nested within a 15x15 target produce nearly the same AMV as from the 15x15. A clustering utility (DBSCAN) is used to identify the dominant signal in the 5x5 AMVs. This approach minimizes the slow speed bias in the AMVs. A journal article is being prepared detailing this method.

**IWW10\_WG1 Recommendation 1:** Details of this algorithm will be made available on the IWWG web page. All producing centers are encouraged to test this approach within their processing framework.

### Height Assignment

Height assignment topics briefly discussed in WG1 were height assignment methods used in situations involving low-level temperature inversions, and using pixel level cloud products derived from upstream cloud height algorithms as a means to arrive at representative AMV height assignments. This was a response to CGMS Recommendation 37.23: Re-evaluate the approach for height assignment of low-level winds, and height assignment validation in general for all levels of AMVs, especially using the A-train data.

**IWW10\_WG1 Recommendation 2:** In response to CGMS Recommendation 37.23, all AMV producers should validate their AMV heights against the A-train suite of instruments, model, sonde, and profiler data. Further, attempts should be made to use A-train cloud top heights in AMV processing. As a first step to this, comparisons should be done between existing cloud heights derived from traditional methods used in AMV processing and cloud product heights derived algorithms that have and use more instrument channels (ie., MODIS cloud heights derived from multiple CO<sub>2</sub> channels). CGMS Recommendation 37.21 hopes that polar AMV processing continues for as long as possible from the polar imagers.

### A satellite mission using a highly elliptical orbit

Louis Garand discussed Canada's plans for the use of highly elliptical orbit (HEO) satellites to provide geostationary like observations from 50-90N. This would help fill in the gap between geo and polar AMVs. A recommendation from the IWWG is requested as this mission has been sold on the benefits of polar AMVs within NWP.

**IWW10\_WG1 Recommendation 3:** A letter of support from the co-chairs is requested for the HEO mission.

### **Status of reprocessing AMVs**

AMV producers were polled on their reprocessing plans. EUMETSAT and the Japan Meteorological Agency (JMA) are actively reprocessing AMVs. The polar winds group at CIMSS is currently reprocessing AVHRR data with parallax corrections. MODIS reprocessing is planned, but no activity is being done at this time. NOAA, the Korea Meteorological Administration (KMA), and the Satellite Application Facility on support to Nowcasting and Very short range forecasting (NWCSAF) have no plans to reprocess at this time. The China Meteorological Administration (CMA) has plans to do this but would need access to archived model fields. A World Meteorological Organization (WMO) initiative, the Sustained, Coordinated Processing of Environmental Satellite Data for Climate Monitoring (SCOPE-CM), is requesting the reprocessing of AMVs as one proposal in their overall plan.

**IWW10\_WG1 Recommendation 4:** In response to the WMO SCOPE-CM initiative, all AMV producing centers are encouraged to reprocess their historical data sets.

### **Global AMV Inter-comparison Study**

The working group members recognized the importance and continued interest in an international inter-comparison study. Iliana Genkova presented the final results from the first study at IWW10. All participants in the working group expressed interest in moving this forward. Members present in the working group were JMA, CMA, NWCSAF, NOAA/CIMSS, and KMA.

Several requests were discussed either in the working group or at the end of Iliana's talk. First, the Met Office requested that the date of the imagery be more recent. Second, Eumetsat indicated that it would be hard for them to participate if Meteosat data was not used. Third, NWCSAF requested that more than one data set be processed.

To proceed forward, dates will need to be chosen, and a new member will need to be identified to perform the analysis. Iliana Genkova will not be able to perform this function.

**IWW10\_WG1 Recommendation 5:** In response to CGMS-37 R37.18 and R37.19, further inter-comparison studies should continue. A new time frame should be chosen soon with the hopes of presenting results at the IWW11.

### **Simulated Imagery Study**

The working group showed a continued interest in using simulated satellite imagery to generate AMVs. Most producing centers expressed interest in using a simulated Meteosat data set produced at CIMSS. Details about the simulation may be found here: [http://cimss.ssec.wisc.edu/goes\\_r/awg/proxy/nwp/ncsa\\_msg/](http://cimss.ssec.wisc.edu/goes_r/awg/proxy/nwp/ncsa_msg/).

**IWW10\_WG1 Recommendation 6:** In response to CGMS-37 R37.23, AMV producers should begin to look at the MSG simulation. Potential results between centers could be compared in much the same way as in the inter-comparison studies.

### **Other topics briefly discussed in WG1 without leading to recommendations**

#### *Tracking*

The group discussed the possibility of generating and comparing the forward and backward displacement of a tracer (for each image pair) as a possible quality control approach. Such an approach could help to ensure consistency in the displacement solutions between image pairs while offering the potential for quantifying the uncertainty in the displacement solution.

### *Polar Winds*

Ongoing issues with polar AMVs were discussed within WG1. One question raised was the viability of 100 minute AMVs. Members from the polar group at CIMSS believe that tracking over 100 minutes can be reliable. However, EUMETSAT scientists noted that Metop AMVs degrade when using image pairs separated by more than 60 minutes within their algorithm suite. A potential use of "back-tracking" was discussed. In this method a pair of images is used instead of the normal use of triplets. This would enable the use of larger swaths of coverage in the hopes of filling in the gaps between polar and geo AMVs. All groups are encouraged to test this method, which is presently being studied at EUMETSAT.

### *Unifying QI*

Work towards unifying the QI approach. At a minimum it would be interesting to poll all of the producing centers about their QI practices. A page on the IWWG web site could be set up for comparison purposes.

### *Multi-Satellite BUFR*

The CIMSS polar winds group continues to work on multi-satellite AMVs. How is this best represented in the BUFR file? Currently the WMO understands this issue and is considering how to represent the mixed satellite environment. The IWWG will most likely follow the WMO lead.

### *IWWG Web Site*

The IWWG web site was discussed. A consensus of members agreed that the site should be used more and should act as a portal to many of the discussions at the workshops. IWWG membership is encouraged to review the IWWG web site and suggest updates/additions to the web page.

### *MISR AMVs*

Roger Davies gave a summary of the MISR instrument. Current limitations are that the instrument is in the visible spectrum only, it has a narrow scan swath, and that it takes up to 24 hours to distribute the AMV product. Group members recognized the potential of MISR AMVs for which the stereo view allows very accurate (forecast independent) height assignments. In this regard, AMV producers are encouraged to use MISR winds to validate their respective height assignments. Comparison of MISR AMVs against Meteosat AMVs presented in session 6 appears promising. WG1 encourages efforts to test MISR in NWP first, in order to support more actively the proposed initiatives to develop MISR for timeliness and coverage requirements of NWP.

### *DWL AMVs*

Ad Stoffelen briefed the working group on the ADM-Aeolus DWL mission. The satellite is expected to launch late in 2011. A calibration/validation program would commence in 2012 for 6 months. A level 2 processor is being built with help from ECMWF and Meteo France. This will be a portable piece of software and freely available to anyone. EUMETSAT may do near real time L2 processing.

### *NWP SAF AMV monitoring*

WG1 judged the NWP SAF report and website very useful. It would be helpful to have best-fit pressure statistics added to the suite.