

REPORT FROM WORKING GROUP I: AMV EXTRACTION AND QUALITY CONTROL METHODS

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INTRODUCTION

Several key areas related to wind extraction and quality control were addressed during the Ninth International Winds Workshop. Important results from the AMV inter comparison study were presented and results from the use of simulated imagery in AMV production were provided. Renewed attention was given to relating tracer and height assignment pixels and also to error specification (QI, EE). Considerable progress was noted in the generation of AMVs from MISR data and in the use of the A-train to better understand relevant physics and for verification.

Working Group I discussed several topics related to wind extraction methods and quality control. The items addressed included material arising from the Workshop presentations and as a result of liaison with CGMS. Several of the items addressed arose during the the Plenary Discussions chaired by Johannes Schmetz and Ad Stoffelen. Key areas discussed are summarised below.

Intercomparison Study.

The working group members recognised the importance of the AMV inter-comparison study, the results of which were presented at the workshop by Iliana Genkova. They recommended that the study should be continued, with more tightly defined study goals. In relation to the goal to compare algorithms for height assignment and quality control, it was recommended that where possible all participants in the study use exactly the same target locations. It was also agreed that common sizes for target and search areas should be applied (using an even number of pixels, because some AMV derivation systems do not allow an odd number).

It was also noted that a new date for the Intercomparison should be defined with images using the new radiance definition now used at EUMETSAT. Working group members expressed a preference to select a date for both summer and winter. Moreover, it was noted it would be of considerable benefit to co-ordinate the Intercomparison with the study on simulated images, so that the same dates and times are used.

The comparison should be extended and include all QI components, the RFF, RFI and all components of the Expected Error (EE).

IWW9_WG1 Recommendation 1:

AMV producers should continue the inter-comparison study. The goals of the study should be tightly defined and documented. A new date should be defined, preferably one in Summer 2008 and another one in Winter 2008/2009. It is strongly

recommended to co-ordinate this study with the study on simulated images, so that a common date will be used. If feasible, the AMV producers should all derive winds from a pre-defined set of target locations.

Simulated Imagery Study

The working group noted with considerable interest the results of the study using simulated images to generate AMVs. The study was performed by ECMWF and presented at the workshop. Similar studies have also been performed at the University of Wisconsin. The Working Group noted the importance of studies of this type and noted they could be used to investigate in more detail areas such as optimising AMV estimation and error characterization and the determination of error structure functions. The members suggested that further studies be undertaken, some at higher horizontal and vertical resolution if feasible, to improve the modeling of cloud and the wind field.

IWW9_WG1 Recommendation 2:

The study with simulated images should be continued preferably with a model that has a higher horizontal and vertical resolution. It should be co-ordinated with the AMV inter-comparison study.

CGMS Wind Statistics

It is important to have a central storage point for CGMS wind statistics, which is accessible to everyone interested. The IWWG web-site is the obvious candidate for this. The working group members agreed that the web-site should include a description of the methods used by each wind producer in the generation of the statistics, other than the CGMS specified criteria (e.g., methods for handling outliers).

IWW9_WG1 Recommendation 3:

The CGMS wind statistics should be accessible on the IWWG web-site. The site should contain a description of the criteria used in the generation of the statistics, not only the criteria specified by CGMS, but also those applied by the individual wind producers.

Rapid Scan Winds And Mesoscale Modeling

There is already some experience with using (rapid scanning) winds in the context of mesoscale modelling and data assimilation. There are also some documented improvements in forecast skill associated with higher temporal resolution wind observations. Work in these areas needs to be continued to assist in the planning of future observation methodologies and the optimization of related assimilation efforts.

IWW9_WG1 Recommendation 4:

More studies are needed on the use of (rapid scanning) winds in the context of mesoscale modelling and data assimilation. These are needed to assist in the planning of future observation methodologies and for the optimization of the related assimilation methods.

Wind Derivation and Height Assignment

Results of a wind derivation method that directly relates the tracking target pixels to the image pixels that are used for the height assignment were presented at the

Workshop. This is a promising technique and should be pursued. In recent time the resources devoted to this area of development have been limited, despite the fact that relating tracking and height assignment pixels and the determination of cloud height remain important sources of error in the generation of atmospheric motion vectors.

IWW9_WG1 Recommendation 5:

Wind-derivation methods that identify the pixels that contribute most to the tracking and use these pixels in height assignment, should be further investigated.

(One example of this type of work was presented by Régis Borde and Ryo Oyama at the Winds Workshop.)

Error Characterization

The Working Group discussed the use of the QI at higher spatial resolutions and the use of the Expected Error (EE) components (total wind error (m/s), horizontal error components (m/s), height error (hPa), wind vector determination error (m/s)) for error characterization, quality control and data thinning. It also discussed the feasibility of reporting the expected error (components) in the winds BUFR product.

IWW9_WG1 Recommendation 6:

Wind producers should derive the Expected Error for each wind. The methods of reporting the Expected Error in the BUFR product should be documented.

Next-Generation Wind Determination

The working group was aware of the proposed move to infrared hyper-spectral observation from geostationary orbit by several wind producers. A number of studies have been completed (for example in relation to the GIFTS project) documenting the benefits of wind determination using hyper-spectral observations. After a discussion on the future direction of wind derivation from satellite the working group made the following recommendation.

IWW9_WG1 Recommendation 7:

A consolidated study should be presented at the next International Winds Workshop on the use and benefits of hyper-spectral observations for the measurement of atmospheric motion.