

## PREPARATION OF AND RECOMMENDATIONS FOR THE 10TH INTERNATIONAL WINDS WORKSHOP

The paper announces the 10th Workshop of the International Winds Working Group (IWW10) to be held in Tokyo with the Japan Meteorological Agency as local host. The paper recalls pertinent actions from the 9<sup>th</sup> International Winds Workshop, which took place from 14-18 April 2008 in Annapolis, and relevant actions and recommendations from CGMS 36.

The paper puts forward research and technical issues related to AMVs for discussion in CGMS WGII. It is expected that other topics will arise during the discussions at WGII; those will provide the basis for guidance and recommendations to IWW10 for further elaboration.

CGMS 37 is invited to:

- i) discuss in WGII the scientific issues and topics addressed in the paper with the goal to set priorities as required for future work
- ii) add additional topics and issues on the basis of discussions at CGMS37 WGII
- iii) to provide guidance on topics to be addressed at the 10<sup>th</sup> IWWG
- iv) provide support to the next IWW10 meeting by approving participation of scientists and operational staff working on the utilisation and derivation of satellite winds and, if possible, by providing some support to travel of relevant people from the research community.

The paper also briefly introduces the new website of the International Winds Working group.

This paper has been written by the IWW rapporteur jointly with the two co-chairs Dr. Mary Forsythe (UK) and Mr Jaime Daniels (USA).

Action/Recommendation proposed: CGMS37 is invited to provide guidance for discussion at the 10<sup>th</sup> International Winds Workshop on topics and issues related to the derivation and use of winds from satellites.

## **Preparation of and Recommendations for the 10th International Winds Workshop**

### **1 INTRODUCTION**

The paper announces the 10th Workshop of the International Winds Working Group (IWW10) to be held in Tokyo with the Japan Meteorological Agency as local host.

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This paper has been written by the IWW rapporteur jointly with the two co-chairs Dr Mary Forsythe (UK) and Mr Jaime Daniels (USA) who took over the Co-chairmanship from Mr Chris Velden and Dr Kenneth Holmlund.

### **2 THE NEW WEBSITE OF THE INTERNATIONAL WINDS WORKING GROUP**

A new website for the International Winds Working Group has been established since the last meeting of CGMS and is hosted at the Cooperative Institute for Meteorological Space Studies (CIMSS) at the University of Wisconsin in Madison. The website has been jointly developed by Mary Forsythe and Iliana Genkova (web page coordinator). The url is: <http://cimss.ssec.wisc.edu/iwwg/iwwg.html>.

### 3 THE 10TH INTERNATIONAL WINDS WORKSHOP (IWW 10)

The 10th International Winds Workshop (IWW 10) will take place in Tokyo from 22 – 26 February 2010. The Japanese Meteorological Agency (JMA) will host the Workshop. The local organizer is Mr. Akihiro Shimizu of JMA. The workshop is being co-organized by JMA, the National Environmental Satellite Data and Information Service (NESDIS) of the National Oceanic and Atmospheric Administration (NOAA), and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT). The workshop is co-sponsored by JMA, EUMETSAT, NOAA/NESDIS, and the World Meteorological Organization (WMO).

The members of the joint Scientific Program Committee are: Mr. Ryo Oyama (JMA), Mr. Koji Yamashita (JMA), Mr. Arthur de Smet (EUMETSAT), Mr. Jaime Daniels (NOAA/NESDIS, Co-Chair), and Dr. Mary Forsythe (Met Office, Co-Chair).

Abstracts for presentations at IWW10 have been solicited in the 1<sup>st</sup> announcement and were due by 15 September 2009.

The workshop is announced in detail on:

[http://www.jma.go.jp/jma/jma-eng/jma-center/nwp/10IWWG/top\\_10IWW\\_JMA.html](http://www.jma.go.jp/jma/jma-eng/jma-center/nwp/10IWWG/top_10IWW_JMA.html)

and:

<http://cimss.ssec.wisc.edu/iwwg/iwwg.html>

The International Winds Workshop run by the International Winds Working Group is one of currently three working groups directly reporting to CGMS and accepting and waiting for direct advice from CGMS. The International Winds Workshop provides to CGMS and its members the necessary technical and scientific oversight on operational winds processing and is also a forum to present advances and new ideas in this specialised field. As for previous workshops participation from all organisations operating meteorological satellites, as well as from users of data and product and from the science community are strongly encouraged. Presentations on operational and experimental wind retrievals from satellite imagery and discussions on the use of the wind products for Numerical Weather Prediction, nowcasting or for climatological applications are an essential part of the International Winds Workshop. In fact the workshops have become an established and well-functioning forum for constructive discussions between operational users of the wind products, the producers and the scientific community. Most of the coherent progress in terms i) consistent science for the derivation and quality control of winds and ii) the use of the data at NWP centers has been accomplished by the International Winds Workshops. In addition, research work on wind retrievals from active and passive microwave instruments has been encouraged as well as presentations on future wind observing systems from space which have become a permanent part of the workshop programme.

#### 4 RECALLING HIGHLIGHTS OF IWW9

In this section we just recall the salient points of the 9<sup>th</sup> International Winds Workshop. Much of the discussions and work resulting from IWW9 was in response to CGMS recommendations and as a continuation of research and development addressed at previous workshops.

Highlights from IWW9 included:

An intercomparison study for AMVs pursued by CGMS members using a common MSG data set

*The first part of this study had been presented at IWW9. A final summary is provided as EUM-WP-26 written by Genkova et al.*

A study using image data simulated from NWP fields for the derivation of AMVs

*The feedback on the first study has been very stimulating and further studies with a clear focus on questions to be answered could be pursued.*

An improved height assignment where the pixel selection for height assignment is based on the feature that is being tracked

*This is being pursued and has been documented in papers by EUMETSAT and JMA*

A novel study investigating whether an AMV should be assigned to level or layer.

*This has been published as journal paper 'Identifying the uncertainty in determining satellite-derived atmospheric motion vector height attribution by Velden and Bedka in the Journal of Applied Meteorology and Climatology, 2009*

Studies involving the use of A-train data to assess AMV height assignments

*Some science studies (Sèze et al, 2008, IWW9) have been concluded whereas others are ongoing.*

Work in NWP to better handle correlated errors (notably work at ECMWF)

*Current methods are based primarily on data thinning and enhanced observation errors. An alternative approach, to allow for correlated error directly in the assimilation, is being pursued at ECMWF*

Research to better understand the impact of AMVs in NWP and the error characterisations of AMVs.

Various initiatives highlighted above have contributed to better understanding of the AMV error characterizations.

In addition:

- 4<sup>th</sup> analysis of the NWP SAF AMV monitoring due December 2009. Previous analysis reports available at:  
[http://www.metoffice.gov.uk/research/interproj/nwpsaf/satwind\\_report/analysis.html](http://www.metoffice.gov.uk/research/interproj/nwpsaf/satwind_report/analysis.html)
- AMV data denial experiments run at 6 NWP centres for the same period (12 Dec 07-12 Jan 2008).

Work to improve understanding of how best to derive and use AMVs for mesoscale applications

Ongoing. Has become the focus of research as part of the preparation for future satellite programmes (GOES-R), Meteosat-8 rapid scan, Meteosat Third Generation, MTSAT follow-on (tbc))

## 5 RECOMMENDATIONS/ACTIONS FROM CGMS 36 RELATED TO AMVs

This section recalls the recommendations and actions from the last CGMS meeting CGMS36. Action and recommendations have been addressed by contributed papers from the various CGMS members. A concluding paper with a final summary and further suggestions has been written by Genkova et al. as EUM-WP-26.

**Recommendation 36.22:** All CGMS members are encouraged to continue or to commence participation in the CGMS AMV intercomparison using the specific MSG image data.

**Action 36.18:** Co-chairs of IWWG, jointly with Dr. Iliana Genkova, to provide a summary paper describing and evaluating the CGMS AMV intercomparisons using MSG image data. Deadline: CGMS-37 (Action closed with WP 26.)

**Action 36.19:** Satellite operators deriving AMVs to summarise their methods and ways to characterise the AMV errors, with emphasis on the height assignment error. Deadline: CGMS-37

**Recommendation 36.23:** CGMS agencies to report on the height assignment of AMV cloud tracers using additional information on cloud characteristics.

## 6 OTHER TOPICS TO BE ADDRESSED

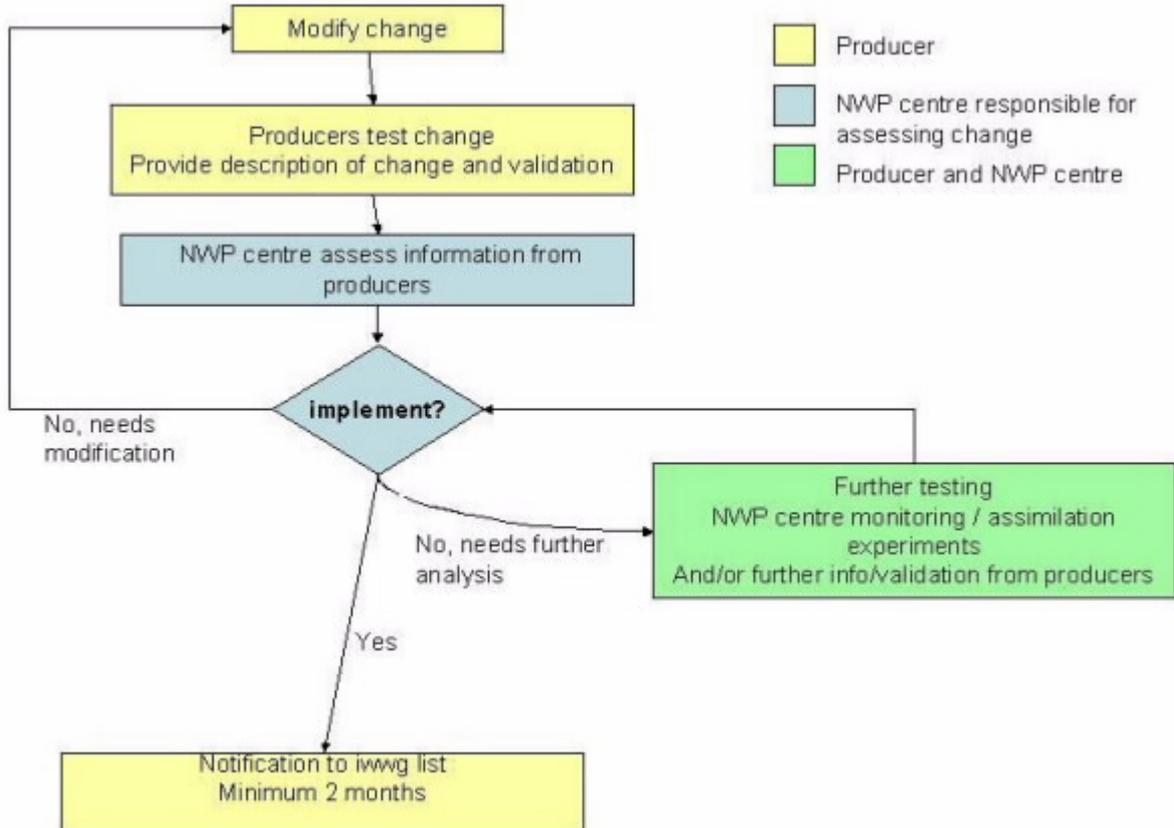
This section summarises topics and issues suggested for future work, some of which are addressed in the previous sections.

Many of the ideas discussed in this section aim to address a few key challenges for AMV data including:

- complicated error characteristics
- assumptions in AMV derivation and assimilation (e.g. passive tracer, point measurement, uncorrelated errors)
- differences in AMV derivation between operational producers

WGII should discuss the points below item by item and provide guidance to CGMS37. The items below are in no particular order of priority:

Discussion of change and implementation process involving updates to AMV algorithms. A process has been outlined below, with the proposal that the NWP centre responsible for assessing the change takes the final decision on implementation, but taking into account requirements from the producers.



Re-evaluate approach for height assignment of low-level winds.

Height assignment validation in general for all levels of AMVs, especially using the A-train data.

Further studies using AMVs derived from simulated imagery. Which question do we need to address that take the benefit from such unique experiments (e.g. influence of cloud formation and dissipation on AMV derivation)

Consider issue of representing AMVs as layer observations. This was addressed in the paper: "Identifying the Uncertainty in Determining Satellite-Derived Atmospheric Motion Vector Height Assignments" by C. S. Velden and K. M. Bedka. This provides a good starting point, but we may benefit from additional information in the image data for the derivation of AMVs, (e.g. variability in pixel-based heights from new height assignment schemes (e.g. CCC scheme at EUMETSAT)) and information on cloud optical depth.

Discuss how best to derive and assimilate mesoscale winds for high resolution NWP

Investigations into use of hyperspectral sounder data on future geostationary sounding missions

Use of additional information on cloud characteristics (e.g. microphysics) within the AMV derivation schemes. What is a realistic way forward to use the insight for improved operational algorithms (e.g. height allocation based on optimum estimation which simultaneously provides information on cloud microphysics)?

Review summary paper on analysis of the AMV intercomparison study by Iliana Genkova and provide suggestion for future work.

With reference to developments at EUMETSAT and JMA, other producers to consider modifying their algorithms to better link tracking and height assignment.

Review CGMS Action 36.19 and discuss options for developing error estimates (u, v, height), with initial emphasis on heights.

The topic of rapid-scan AMVs was a key topic in past IWWs, and ongoing activities demonstrate inter alia the positive impact on hurricane track forecasting. It is important to keep the momentum in current efforts by improving further the quality and by showing the utility of AMVs derived from imagery with shorter imaging cycles.

Initial discussions on the usefulness of a portable and shared AMV derivation software package that should work for all current satellite imaging systems as well as for the future imagers like ABI on the GOES-series, the FCI on MTG, the follow-on satellites to MTSAT and other future geostationary imagers.

## **7 CONCLUDING REMARKS**

CGMS 37 is invited to:

discuss in WGII the scientific issues and topics addressed in the paper with the goal to set priorities as required for future work

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