



# IWW13 WORKING GROUP 1 (WG1): Methods

Chairs: JLeM (BoM) and DS (CIMSS)

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## Consistent Wind Products

The move to a single wind retrieval algorithm for all satellites is not currently feasible. This is because of the difference in satellites, use of different languages and architecture and the effort required. As a single wind retrieval system is not practicable, there is significant benefit in utilising algorithm modules (for example a particular tracking or height assignment method or a common quality indicator) which are shown to be superior in some way by the community. Product intercomparisons are critical to determining the quality of various algorithm components and determining which algorithms are suitable for exchange.

**IWW13-WG1 Recommendation 1: IWW13 encourages collaboration and sharing of software modules and elements between producer centres to compare the methods and algorithms components and assist in the production of consistent high quality products.**



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## Consistent Wind Products- Settings for HR Winds

All producers should document settings for HR winds. A template should be made available on the IWW Website and contain information such as tracking method, tracking box size and height assignment method. Provision of this information will assist in the generation of consistent wind products.

**IWW13-WG1 Recommendation 2: IWW13 encourages all producers to document the settings used in their systems in production of high resolution winds. To assist in this task a template will be available on the IWW website and the collected data will be made available to the community.**



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### Error Characterization

NWP centres are all familiar with the QI, though there are different ways of calculating this parameter. The QI with and without the forecast should continue to be included in winds products.

A common QI (consistent coefficients etc.) should be defined before the 3<sup>rd</sup> AMV Intercomparison Study for use during this study and for consideration for wider use afterwards.

Different product developers may include other error characterization such as the EE in their data/BUFR files. Some data may be primarily for their own diagnostic use. Examples are cluster characteristics and multiple maxima.

WG1 felt in the intermediate term that it is important to separate tracking and height errors.



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### Error Characterization

**IWW13-WG1 Recommendation 3: There should be continued discussion with wind product users and NWP centres in order to determine the optimal error characterisation that should be included in data products.**

**IWW13-WG1 Recommendation 4: There should be a Common QI (CQI) defined before the Third AMV Intercomparison Study for use by participants and for consideration for wider use afterwards in data/BUFR files. There should also be an EE included where computed, in data/BUFR files.**



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## Data Formats

BUFR: Ongoing discussions are currently being held in relation to the new BUFR format. These discussions involve consideration of the cloud properties to be included in the new BUFR and the specification of error characterization parameters.

NetCDF: For sharing of AMV datasets, a netCDF CF-compliant format should be used. This definition will need to be defined.

**IWW13-WG1 Recommendation 5: IWW13 supports August 2016 as the deadline for initial BUFR content definition. This definition should include cloud properties and the definition of error characterisation elements.**

**IWW13-WG1 Recommendation 6: IWW13 supports a CF-compliant netCDF format for AMVs.**



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## Reprocessing

There is at the moment considerable interest and activity in the reprocessing and verification of global wind datasets for reanalysis and climate studies. To assist in this process IWW 13 recommends the production of a report detailing global wind processing status in relation to the production of a historic global wind datasets suitable for use in reanalysis and climate studies. The difficulties and issues encountered in reprocessing should be described in the document.

**IWW13-WG1 Recommendation 7: IWW 13 recommends the production of a succinct report detailing global wind processing status in relation to the production of a historic global wind datasets suitable for use in reanalysis and climate studies. This report should be available at CGMS(2017) and for IWW 14.**

D. Santek (SSEC/CIMSS) lead.



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## Intercomparison

The next intercomparison study will be coordinated with an ICWG intercomparison. This is to ensure the same dataset is used to include additional comparisons with cloud height and other cloud properties. Also, based in part on the findings in the previous winds intercomparison, a Common QI (CQI) should be defined and provided by all winds producers.

**IWW13-WG1 Recommendation 8: Investigate the possibility of completing the next winds intercomparison by the next IWWG in mid-2018. This includes coordinating with the ICWG intercomparison and including the examination and use of MISR winds and heights.**

J. Daniels lead.



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## Winds from Hyperspectral Retrievals

Tracking with hyperspectral data, such as tracking in moisture retrieval space rather than radiance space, was discussed. Several talks were presented on current efforts and future platforms. Evaluations should continue for use not only in data assimilation, but as observations (e.g., pseudo-radiosondes).

**IWW13-WG1 Recommendation 9: Further studies should be undertaken to assess the value of winds from hyperspectral retrievals.**





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## Winds from MISR-like Instruments

Tracking with hyperspectral data, such as tracking in moisture retrieval space rather than radiance space, was discussed. Several talks were presented on current efforts and future platforms.

**IWW13-WG1 Recommendation 10: Further studies should be undertaken to further assess the value of MISR or MISR-like instrumentation for global wind retrieval.**



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**IWW13-WG1 Recommendation 1: IWW13 encourages collaboration and sharing of software modules and elements between producer centres to compare the methods and algorithms components and assist in the production of consistent highquality products.**



# IWW13 Charge to Working Groups

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## Plenary Discussion topics on Friday

- intercomparison
- update to OSCAR wind requirements

Handle these separately don't need to be discussed here



# 3<sup>rd</sup> AMV Inter-comparison Study

## *WG1 to work*

- For the 3<sup>rd</sup> AMV inter-comparison study it is proposed to use an image triplet from JMA's Himawari-8/AHI, the first of the next generation series of geostationary imagers with higher spatial resolution, higher temporal resolution, and more spectral channels.
  - The new spectral channels will bear new information on cloud microphysics
  - The higher temporal resolution will be useful to better understand the characteristics of the tracked cloud.
  - IWWG will select image triplets from H-8/AHI golden day (August 19, 2015) data that the ICWG intends to use for its next cloud inter-comparison study
    - Cloud products well studied and characterized by ICWG members
    - Two typhoons with a multitude of different cloud regimes
    - CALIPSO data/products, collocated to H-8/AHI data, are available for validation

### Discuss

- Use of image triplets with 10 minute and 2.5 minute temporal resolution
- Which bands to use in experiments
- Algorithm configurations to use in each experiment (prescribed vs. that used by each satellite operator)
- What else should be done? Identify specific scenes to look at and study?
- How do we engage the ICWG as part of this?
- Lessons learned from 2<sup>nd</sup> AMV intercomparison study?



# IWW13 Charge to Working Groups

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## AMV derivation

- to average component winds or not?
- settings for high resolution winds
- QI formulation for synoptic vs meso AMVs
- backwards compatibility of software
- ideas for collaboration with ICWG community
- use of IWWG wiki to share e.g. Details of QI, height assignment approaches etc.
- consistency of products
- modular approach
- ideas for information on accuracy of tracking step



# IWW13 Charge to Working Groups

## Winds in NWP

- investigating use of new quality information
- Opportunities to improve QC and assignment of observation errors to AMVs
- use of high resolution winds
  - What are NWP requirements to improve high impact weather forecasts?
    - Nowcasting needs, benefits
    - Discuss issues, limitations, challenges? How to resolve, mitigate? What Further work needed?
    - Correlated errors (spatial & temporal)
    - Layer obs operator
    - Situation dependent errors
    - Thinning/superobbing
- recommendations on notification and overlap for changes (new satellites / derivation / BUFR)
- experiences with new datasets – anything to discuss/investigate further....



# IWW13 Charge to Working Groups

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## Investigating sources of error

- use of lidar cloud top heights
- simulated imagery studies
- NWP SAF-type investigations
- Dataset intercomparisons
- comparisons to stereo heights
- other ideas?





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## Hyperspectral winds

- winds vs radiance assimilation
- derivation approaches....



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## Winds in climate

- gaps in reprocessed datasets
- any climate investigations ongoing using satellite-derived wind data?



# *Establish commonality in the derivation of satellite products*

## *WG1 to work*

### **1. CGMS High level priority plan 2014-2018**

-> consistent products (**WG1**)

*3.2 Establish commonality in the derivation of satellite products for global users where appropriate (e.g. through sharing of prototype algorithms);*

*3.2.1 Infer guidance from the ongoing intercomparison of AMV products for the future developments towards consistent AMV products. Consider in the guidance the future perspective of having the geostationary ring populated with 16-channel imagers.*

- not necessarily same products (friendly competition is beneficial)
- continue sharing of code, intercomparisons and discussion
- strive towards more commonality – similar approaches based on same science



# IWW13 Charge to Working Groups

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## Use of NWC SAF software

- how being used...
- how it could be used
- Any feedback / suggestions



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## NWP SAF and OSI SAF

- any feedback on winds monitoring and analysis reports
- any feedback on scatterometer software or products



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## Use of IWWG wiki

- BUFR / NetCDF details
- Links to algorithm information, general, QI formulation, height assignment.....
- HR winds



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Feedback on IWW13