

# IWW15

## Working Group 1 (Methods)

### Discussion

**Moderators:** Dong Wu (NASA), Javier García-Pereda (NWCSAF)

**Minutes:** Mariel Friberg (NASA)

**Participants:** Akos Horvath, Americo Allegrino, Amir Ouyed Hernández, Andrew Bailey, Dave Stetner, Dong Wu, Graeme Kelly, Hee Ae Kim, Jan-Peter Muller, Jason Apke, Javier García Pereda, Jeff Key, Jim Carr, Johannes Stauffer, John LeMarshall, Kazuki Shimoji, Kevin Barbieux, Manuel Carranza, Marie Doutriaux Boucher, Mariel Friberg, Miki Abe, Olivier Hautecoeur, Richard Dworak, Sanjib K Deb, Shin Komayatsu, Steve Wanzong

## Key issues of relevance to CGMS: HLPP 4.2.1:

Establish commonality in the derivation of AMV for global users where appropriate (e.g., through sharing of prototype algorithms) and consider backwards compatibility when designing AMV algorithms for the 16-channel imagers, so that present state-of-the-art algorithms can be applied to old imagery.

### ➤ Common QI and AMV BUFR sequence implementation

#### \* **Check when these two actions be completed?**

- ➔ Some centres (EUMETSAT, NWCSAF,...) report tasks are finished; but info cannot be obtained from all centres due to time limitations and lack of reply from all of them.

**ACTION IWWG15 – WG1 – 01: J.García-Pereda to organize a small virtual survey to update this information from all AMV Centres. AMV Centers to answer with Due date: 20 April 2021, 15:00 UTC**

- ➔ EUMETSAT wants to check with other AMV centres corresponding definitions of parameters inside the new AMV BUFR

**ACTION IWWG15 – WG1 – 02: O.Hautecoeur to organize a virtual meeting with other AMV centres to share/establish parameter definitions in the new AMV BUFR. Due date: 15 May 2021.**

## Key issues of relevance to CGMS: HLPP 4.2.1:

Establish commonality in the derivation of AMV for global users where appropriate (e.g., through sharing of prototype algorithms) and consider backwards compatibility when designing AMV algorithms for the 16-channel imagers, so that present state-of-the-art algorithms can be applied to old imagery.

- 4<sup>th</sup> AMV Intercomparison study.
  - \* **Agreement with current plan (GOES 16 image)?**
  - \* **Who takes the lead to make the data available?**
  - \* **Deadline for processing AMVs?**
    - ➔ Organization throughout 4<sup>th</sup> AMV Intercomparison email list managed by S.Wanzong.
    - ➔ Some clarifications provided considering the use of GOES-16 scenes only, of the “Golden day” chosen (20 Oct 2019), of the “best possible wind dataset requested” (several algorithms allow multiple configs).
  - \* **New reference data to be used in the 4<sup>th</sup> AMV intercomparison:**
    - ➔ CALIPSO, Aeolus and potentially MISR.
    - ➔ Stereo winds for GOES16/GOES17 from Dong Wu.
    - ➔ IASI Optical flow (possible option from Olivier Hautecoeur).
    - ➔ NASA Langley Lidar (possible option from Kristopher Bedka – depending on day chosen).

## Key issues of relevance to CGMS: HLPP 4.2.1:

Establish commonality in the derivation of AMV for global users where appropriate (e.g., through sharing of prototype algorithms) and consider backwards compatibility when designing AMV algorithms for the 16-channel imagers, so that present state-of-the-art algorithms can be applied to old imagery.

➤ 4<sup>th</sup> AMV Intercomparison study.

➔ Processing of AMVs is expected to take 4-6 months after reception of data (up to around Dec.2021)

**ACTION IWWG15 – WG1 – 03: Previous survey in Action 01 to include an element checking the participation of the different AMV Centres in the 4<sup>th</sup> AMV Intercomparison.**

➔ The NWCSAF will cover the costs of the study through a Visiting Scientist Activity. The activity will run throughout 2022.

**ACTION IWWG15 – WG1 – 04: Scientists wishing to evaluate the AMV intercomparison study after the reception of the AMV data from the different centres, communicate to [jgarciap@aemet.es](mailto:jgarciap@aemet.es). Due date: 1st May 2021.**

## Key issues of relevance to CGMS: HLPP 4.2.2:

Investigate the best configurations to be used by the AMV producers for use in global and regional NWP models respectively, and clearly define the appropriate requirements for each of them

- A46.04: NWP community to define the best configuration to be used by the AMV producers, for use in global and regional NWP models
  - ➔ Some contacts established with WG2/Data assimilation related to this:
    - F.ex. NWCSAF & R.Randriamampianina/MetNorway in Mar'20 about different AMV configurations to be used for regional/global NWP models
  
  - ➔ Can we help to persuade the NWP community to use our products?
    - A special session in IWW on “Impact of new technologies on NWP” will be helpful.
    - An action is also defined:

**ACTION IWWG15 – WG1 – 05 (started by J.-P. Muller; continued by all relevant people):  
Produce a portfolio of examples (f.ex. papers) of impact of new technologies  
for wind observations in NWP. Due date: before following IWW.**

## Key issues of relevance to CGMS: HLPP 4.2.2:

Investigate the best configurations to be used by the AMV producers for use in global and regional NWP models respectively, and clearly define the appropriate requirements for each of them

A46.06: IWWG to look at improving quality indicators for high resolution wind derivation for mesoscale and regional applications. (Ref. CGMS-46-IWWG-WP-01).

Suggestions & options that can be tested/implemented in the different agencies

### → Better use of correlation surface

- Useful to extract an “horizontal displacement error” for AMVs.

### → Better use of cloud parameters

- “Cloud depth” inside height assignment
- Special remark on “clear sky tracers and AMVs”, which can also be used for image navigation. (interest from centres on this is low in many occasions).

### → Use of other techniques for better characterization

- Example of “Feature Track Correction (FTC) observation operator” shown in this IWW.

## Key issues of relevance to CGMS: HLPP 4.2.2:

Investigate the best configurations to be used by the AMV producers for use in global and regional NWP models respectively, and clearly define the appropriate requirements for each of them

### Investigating new methods and instruments

#### → Stereo products

- Interest shown by several other institutions (EUMETSAT, NWCSAF,...) and other options (f.ex. Himawari+GK-2; 12° separation enough) in spite of difficulties with co-registration.
- A remark is done on the general smaller scale of features involved.
- Suggestions for Quality control: use of AMV common QC; use of co-registration error.

#### → Optical flow:

- EUMETSAT working on error estimation & quality control, and the problem of spatial correlation.
- A suggestion is to provide less dense optical flow output, to facilitate data assimilation.
- A format is also to be defined for the different institutions involved in development.

#### → Tracking features with differential radiances/other bands not investigated.

- Examples: DLR contrail tracking.      CIRA tracking with fire.  
Use of Day-Night Band imagery (DNB).  
Use of SWIR for tracking in the lower atmosphere.

#### → Machine learning and Neural networks (f.ex. for height assignment).

- Examples: DLR artificial neural network CiPS for cirrus clouds.  
SMHI cloud products for NWCSAF/PPS.

Suggestions for development: Use of open source code & data sharing.

## Key issues of relevance to CGMS:

**A46.07: IWWG to consider developing climate projects from Atmospheric Motion Vectors (AMVs) and to report to the CEOS/CGMS WGClimate with a potential pilot project (Ref. CGMS-46-IWWG-WP-01)**

### ➤ Agencies capable of Reprocessing:

- ➔ EUMETSAT (up to 40 year AVHRR datasets!) - JMA - CIMSS if funding available.  
No info from NOAA.

Are current algorithms with latest options (including Common QI and new AMV BUFR) able to process older satellite data?

- ➔ EUMETSAT, JMA latest reprocessings have just finished  
AMV algorithms used have not fully implemented latest options.
- ➔ In EUMETSAT, full implementation requires reprocessing with a timeline of Apr'2024.  
JMA has at the moment no clear reprocessing schedule.

In spite of the efforts, AMV reprocessings not used in reanalysis

- ➔ Interaction needed between AMV reprocessors and f.ex. ECMWF for inclusion.

**ACTION IWWG15 – WG1 – 06: All Reprocessing Agencies to implement latest AMV algorithms with Common QI and new AMV BUFR, and interact with NWP centres for inclusion in reanalysis processes. Due date: before following AMV reprocessing.**



## Key issues of relevance to CGMS:

**A46.07: IWWG to consider developing climate projects from Atmospheric Motion Vectors (AMVs) and to report to the CEOS/CGMS WGClimate with a potential pilot project (Ref. CGMS-46-IWWG-WP-01)**

- Information for AMV Climate projects can be obtained at:  
<https://www.scope-cm.org/projects/scm-10/>
- Contact with WGClimate:
  - ➔ Régis Borde has contacted WGClimate.  
Further clarification from WGClimate is pending.  
Having AMVs included in WGClimate would be a way to manage up with AMV contributions.
  - ➔ There is agreement that AMV products and reprocessing contribute to climate understanding. One driver is statistical AMV analysis.
  - ➔ There is clarity on parameter needs for reprocessings for climate studies: 40 years of LEO and GEO AMVs.  
But should products be individual datasets or a global AMV product?
  - ➔ Key point: Add why long-term AMV reprocessings are valuable.
- Specific options needed for some phenomena (i.e. extreme winds/tropical cyclones), which hardly can be seen inside current reprocessed datasets.
  - ➔ Example of EUMETSAT “Reanalysis of jet streams” can be used as reference.

## AOB

- Feedback on IWW15 and IWWG activities
  - ➔ Positive experience with IWW15.
  - ➔ Community interested in keeping virtual meeting option when moving to in-person meetings.
  - ➔ Improve breakout group space for informal tag-up/discussions in future meetings (platforms that allow for virtual side conversations).
  
  - ➔ Suggestion of use of Slack <https://slack.com/> to keep research/ideas/conversations going year round.
  
  - ➔ S.Wanzong confirms “extended abstracts” for IWW Presentations are not requested anymore due to lack of success in IWW14.

## SUMMARY OF ACTIONS

Related to HLPP 4.2.1:

- 01: J.García-Pereda to organize a small virtual survey to update this information from all AMV Centres. AMV Centers to answer with Due date: 20 April 2021, 15:00 UTC**
- 02: O.Hautecoeur to organize a virtual meeting with other AMV centres to share/establish parameter definitions in the new AMV BUFR. Due date: 15 May 2021.**
- 03: Previous survey in Action 01 to include an element checking the participation of the different AMV Centres in the 4<sup>th</sup> AMV Intercomparison.**
- 04: Scientists wishing to evaluate the AMV intercomparison study after the reception of the AMV data from the different centres, communicate to [jgarciap@aemet.es](mailto:jgarciap@aemet.es). Due date: 1st May 2021.**

Related to HLPP 4.2.2:

- 05: (started by J.-P. Muller; continued by all relevant people):  
Produce a portfolio of examples (f.ex. papers) of impact of new technologies for wind observations in NWP. Due date: before following IWW.**

Related to A46.07:

- 06: All Reprocessing Agencies to implement latest AMV algorithms with Common QI and new AMV BUFR, and interact with NWP centres for inclusion in reanalysis processes. Due date: before following AMV reprocessing.**