



IWW14

Conclusions of Working Group 1 (AMV Extraction Methods)

Chaired by Jaime Daniels and Javier García Pereda
Friday, April 27, 2018



1) Commonality in the derivation of AMV products where appropriate

- The “Common Quality Index” was useful in the AMV Intercomparison for improvement in the quality/consistency of the AMV datasets, with much closer results.
 - To be pursued. A variable in the new AMV BUFR table defined for this parameter.
- Questions presented on its redundancy, and that the temporal comparison is considering an only AMV vector (not the original idea of considering all AMV vectors in an ellipse around the location of the compared AMV).
 - After discussion,
it is concluded that any changes once the current version is implemented, not to start again all the process since the beginning.
- After this, no specific objections are further raised. Next actions are then defined:

IWW14 – WG1 – Action 1: Steve Wanzong to put the current “Common QI module” (such as defined in his email of May 2017) in a repository in the IWWG webpage, from which it can be taken. Due date: 1 June 2018.

IWW14 – WG1 – Action 2: All AMV producers to implement the “Common QI module” in their algorithms. Due date: before IWW15.



2) JMA height assignment method

- Interest is raised on “JMA new height assignment method”, for evaluation by other AMV producers. With this:

IWW14 – WG1 – Action 3: JMA to make public the “JMA technical note” in English in which they describe their current height assignment. Due date: 15 May 2018.

IWW14 – WG1 – Action 4: Steve Wanzong to put the “JMA technical note on their current height assignment” in the repository in the IWWG webpage from which it can be taken. Due date: 1 June 2018.

IWW14-WG1 Recommendation 1: Kazuki Shimoji invites all AMV producers to read and study “Pattern recognition and Machine learning” by Christopher M. Bishop for understanding of optimal estimation and data assimilation.

IWW14-WG1 Recommendation 2: IWW14 continues to encourage collaboration and sharing of software modules and elements between AMV producers to compare the methods and algorithms components and assist in the production of consistent high quality products.



3) Optimal configurations of AMVs for Global and Regional models

Notifications by Mary Forsythe (MF) from the corresponding discussion are considered:

- AMVs every 10 minutes should be considered for regional models.
- EUMETSAT and NOAA are only calculating every 60 – 30 min. Jaime Daniels says this is insufficient today, and that there is real option now for more.
- NWCSAF can instead calculate AMVs for every slot (15 min with MSG, 10 min with next generation satellites).

It seems clear that different applications (global and regional NWP models) can need different scales of AMVs, and that both requirements cannot be met at the same time.

- With EUMETSAT and NWCSAF examples, it is clear that there are already AMV algorithms running for both scales (global and regional). It is possible already to have AMV datasets for both options, to be used separately.

John Le Marshall shows that NWP resolution is increasing very quickly, and that these configurations could change very quickly in the future.

Feng Lu shows that the calculation of AMVs becomes more difficult for larger image resolutions, and a clear knowledge of the scale up to which calculations can go is needed.

On the other side, for the optimization of the AMV datasets, it is clear that only NWP community can define the best requirements for both scales. This cannot come from the AMV producers.

Considering all this,

IWW14 – WG1 – Action 5: NWP community to define the best configuration to be used by the AMV producers, for use in global and regional NWP models. Due date: before IWW15.



4) Geometric Height Techniques

Nice presentation by Feng Lu (CMA)

A discussion is taken, concluding that GOES-R,-S give the best options for study in the near future,

These studies could derive in related operational products later on.

For example, Eumetsat plans for day-2 of Sentinel-3.

IWW14 – WG1 – Recommendation 3: When ready, AMV producers with geometric height techniques to compare these datasets with AMVs with other height assignment techniques.



5) Aeolus Winds

- Launch in August 2018
- Availability of Aeolus winds ~6 months after launch
- Great potential of these winds to improve NWP forecasts
- Aeolus not expected to show unexpected problems in its processing due to long time of testing.
- In 2019 it could be used operationally.

IWW14 – WG1 – Recommendation 4: When ready, AMV producers to compare Aeolus winds to their respective AMVs and report findings at IWW15



6) Considering the new AMV BUFR template

- Considering the new AMV BUFR template, the proposal defined in IWW13 was approved by WMO. After enquiry with the present AMV producers, next action is raised:

IWW14 – WG1 – Action 6: AMV producers to adopt the new AMV BUFR template.
Due date: 30 April 2019.

To aid NWP users, AMV producers should provide new BUFR datasets in parallel with their heritage BUFR datasets for a period of 6 months.

- Recalling IWW13 WG2 recommendations, NESDIS has made offline test data available for this new BUFR template for technical testing/implementation.
- After this, AMV producers should start providing their AMV dataset with this new AMV BUFR template, with a six month overlap period (as requested by Australia) providing the same data in the new and old format.
- Considering comments by the several AMV producers present in the meeting: the adaptations to include actual values for all parameters in the BUFR could be progressive.
- **IMPORTANT:** Good communication between satellite operators and NWP users is needed to facilitate the transition to the new BUFR template. Careful and staged planning is needed.

IWW14 – WG1 – Recommendation 5: NWP community to prepare carefully for the use of the new AMV BUFR template as by the different AMV providers.

- Anne Grete Straume asks if this is a general BUFR template for winds or if it is specific for AMVs. The group concludes that it is very specific and that they lidar winds could not consider it as option.



7) Considering general aspects of all AMV algorithms

- Considering general aspects of each AMV algorithm, it is recalled that a general table with the characteristics of all AMV algorithms is still not available.
- Two actions are then defined:

IWW14 – WG1 – Action 7: Javier García Pereda to define a questionnaire related to the characteristics of all currently available AMV products, including information of dependencias on NWP data and send it through the IWWG email list for AMV producers.
Due date: 1 July 2018.

IWW14 – WG1 – Action 8: All AMV producers to send back corresponding questionnaire, which will be put in the repository in the IWWG webpage. Due date: 1 October 2018.

To remind also:

IWW13-WG1 Recommendation: 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.



8) Considering a possible “tracking error”

- Considering a possible “tracking error” related to the shape/size of the AMV correlation surface
(for which there is already a location in the new AMV BUFR template):

IWW14 – WG1 – Recommendation 6: AMV producers to investigate and develop approaches that capture “tracking error” metrics related to the AMV correlation surface.

To remind also:

IWW13-WG1 Recommendation: 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.



9) Considering the AMV Monitoring by the NWPSAF

- It is agreed by all that this is really useful, discovering errors/issues previously unnoticed by the AMV producers. It is good that they continue with this work.
- Related to this, there is a warning that AMVs with new sensors/methods could present difficulties and tasks for the monitoring not seen before. There is need that this is evaluated with care.

Considering this,

IWW14 – WG1 – Recommendation 7: NWPSAF to continue the AMV monitoring such as it is being done now.

IWW14 – WG1 – Recommendation 8: AMV producers work to investigate and address issues discovered by the NWPSAF to improve the products.

- Considering the height monitoring that DWD is doing, and its plan to be somehow moved to the NWPSAF AMV Monitoring, it is considered fine and this Working Group endorses it.



10) AMV Intercomparisons

- Considering the next AMV Intercomparison, it is considered useful not to use CALIPSO anymore (because it has not provided much information),

This should be replaced with the inclusion of “AMVs with geometric height techniques” (with two altitude coordinates: stereo height and pressure).



11) Hyperspectral winds vs Radiance assimilation

- Radiance assimilation is impressive,
and is going to happen without any doubt.

Hyperspectral winds will find anyhow a place
in other meteorological tasks:

Nowcasting, operational Watch and Warning,...



12) Hyperspectral winds vs Radiance assimilation

Assimilation of hyperspectral radiances clearly beneficial (presentation by Kirsti Salonen (ECMWF))

Potential methods (e.g., optical flow) to derive 3D winds from hyperspectral sounders (ie., IASI L2 products: T, Q, O3) nicely presented by Olivier Hautecoeur (EUMETSAT). Some limitations, but the potential is there to provide 3D winds.

Hyperspectral winds will find anyhow a place in other meteorological tasks: Nowcasting, operational Watch and Warning,...

IWW14-WG1 Recommendation 9: Further studies should be undertaken to assess the value of winds from hyperspectral retrievals.



13) Administrative items

- 63% of extended abstracts submitted for IWW12;
- 52% for IWW13.
- People not submitting the extended abstract, sometimes because they intend to publish as a journal article.
- On the other side, the extended abstracts are cited though. Should this element be removed from the IWWs?
- There is agreement by the whole Working Group that extended abstracts are good for a better understanding of all the work done. Besides, there is no other place in which all the information from the AMVs is put together, and they can be referenced. In spite of the conflict with referenced papers:

IWW14 – WG1 – Recommendation 10: Participants to the Winds Workshop encouraged to continue submitting extended abstracts for their work shown in International Winds Workshop.



14) Administrative items

- Considering the IWW email list, webpage, wiki pages:
- A permanent solution is needed to be found without rush, but by 2024 a replacement needs to be designated and in place. A suggestion is done for an early career person.
 - ➔ No option could be found as valid now.
- Considering the two-year period between each IWW, everybody agrees that it is correct.