

# IWW16

## Report from WG2

### (Data assimilation)

*Chaired by Mary Forsythe and Iliana Genkova*

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## Topics

1. New BUFR format
2. HLPP: AMV configuration - global model
3. HLPP: AMV configuration - regional model
4. Wind profiles
5. Novel approaches
6. AMV studies
7. Short items: climate studies, surface winds, upcoming changes, IWW16 feedback
8. Any Other Business (AOB)

## 1) New BUFR format

- **NWP centres noted a preference to complete the transition to the new BUFR and particularly to gain access to the extra information for QC. However, the delayed roll-out has not caused too many difficulties.**
- **NWP centres are keen to learn from, and work with, the cloud community on ideas to use cloud scheme output for AMV QC.**
- **There was some interest in accessing information to help define tracking accuracy including a correlation surface constraint.**
- A specific regional QI may not be required, but we should consider quality information relevant to regional AMVs/applications.
- When discussing the idea of common gross error checks, NWP centres noted a preference not to apply a forecast check before passing to users. However, it might be interesting to discuss ideas for other non-model dependent error checks.
- DWD has partially switched to the common QI. Other NWP centres are encouraged to look at switching.
- There was no interest in a common NetCDF format from WG2.

Carry over recommendations from IWW15:

**Recommendation IWW15-WG2-6** to AMV producers: to make use of the new BUFR template to provide further information on the AMV derivation and auxiliary cloud information, as available in their processing.

**Recommendation IWW15-WG2-7** to AMV centres: to continue to evaluate this new information for enhanced AMV quality treatment. This also includes the Common QI which has been rolled out since the last IWWG meeting.

## 2) HLPP: AMV configuration - global model

- **No changes were proposed to the table** and only one minor correction to the notes.
- We agreed to add the following long-standing guidance for overlap periods for satellite change-overs to the configuration document.

Standing recommendations to winds producers:

- To provide a 9-month overlap period when transitioning to a new generation of satellite and for major derivation changes.
  - For like-for-like satellite changes a 3-month overlap period is considered sufficient.
  - To communicate upcoming significant changes in product provision via the IWWG email list (as well as through existing other user notification channels) several months in advance.
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- We discussed preferences for data routing, Most centres are able to use GTS and ftp, but noted it is much harder to use the PDA. NRL noted it is easier for them to access GTS than ftp.
  - We discussed the difficulties of staying up-to-date on producer plans and particularly that information is often hidden amongst numerous e-mails. NWP centres prefer to receive dedicated AMV updates as noted in the recommendation above. Suggestions were made of whether we could use Confluence or collate the information at one centre.

**Recommendation IWW16-WG2-1** to AMV producers/users: to explore options for disseminating information on upcoming changes more efficiently.

### 3) HLPP: AMV configuration - regional model

- **Some minor changes were recommended to the configuration table including to remove the preference for non-overlapping targets.** Ad noted there may be some benefit to over-sampling. This prompted some interesting discussion over how to manage correlated errors.
- Roger noted that he hadn't had time to explore the impact of target box size, but hopes to still look at this.
- **There was discussion around the merits of producing the regional AMVs centrally for Europe using the NWC SAF software. There was some interest.** Currently only the Met Office and NMI run the package themselves, others noted limited resources to explore. Thought would be required on how to define the configuration.
- DWD noted the good coverage of MODE-S and that the local AMVs are therefore less of a priority. There may be some benefit by providing coverage over sea and during night-time.

**Recommendation IWW16-WG2-2** to European NWP centres: to discuss further the idea of a centralised NWC SAF AMV production to support regional models.

**Recommendation IWW16-WG2-3** to NWP centres: to evaluate approaches for making better use of high resolution AMVs in regional models.

**Action IWW16-WG2-1** on Mary Forsythe to update and circulate an updated configuration document.

## 4) Wind profile information

- **WG2 noted the large benefits of Aeolus winds shown at IWW16. We look forward to the potential for follow-on missions, particularly the expected higher quality and vertical resolution and are supportive of the EPS-Aeolus mission proposal.**
- **It is recognised that DWL is unlikely to provide optimal spatial and temporal sampling and we should look at other missions to fill the gaps for wind profile observations.**
- **Most notably, NWP centres are interested in evaluating IASI 3D winds in preparation for MTG-IRS (launch 2024). At least 5 NWP centres noted interest in evaluating the new dataset. There remains uncertainty over whether the long term option will be to assimilate the derived winds or only the radiances (with the wind information coming through the assimilation scheme).**
- **WG2 noted plans for future geostationary hyperspectral sounders and the possibility of small-satellite missions (such as MISTiC) that could help to provide improved coverage of 3D winds.**

**Recommendation IWW16-WG2-4** to NWP users: to evaluate IASI 3D winds in preparation for MTG-IRS. To particularly consider where we see most impact on the wind fields and understand the synergy between this approach and DWL.

**Recommendation IWW16-WG2-5** to EUMETSAT: to consider the development of model independent quality information for the 3D winds. This is also important to consider when defining the new BUFR format.

## 5) Novel approaches

- No current plans were noted for use of ML/AI in the wind assimilation.
- **NWP centres expressed interest in the stereo AMVs and particularly noted the expanded coverage** that might be possible from this approach using the GEO ring and a combination of GEO-LEO.
- **WG2 noted the interesting work using ML and optical flow approaches for AMV production.** It was felt these were less mature for testing in NWP, but noted these are interesting development areas for the future and also for nowcasting.
- It is recognised that the use of ML is rapidly developing and we should continue to explore opportunities.

**Recommendation IWW16-WG2-6** to NWP users: to consider evaluating stereo AMV products and particularly to understand how the height assignment compares to existing approaches and model best-fit pressure.

## 6) AMV studies

- The aim of the discussion was to consider how to make best use of studies such as the AMV intercomparison, NWP SAF analysis reports and other quality investigations
- We could collate a log of known issues from various studies with the aim to help focus future work. It was noted that we could also work with the cloud community to explore some issues.
- An update of progress and plans was provided for the NWP SAF winds monitoring. A query was raised on the length of the plot archive. We keep these indefinitely at the Met Office, but only the last 3 years online. It was agreed the Aeolus plots could remain online. No suggestions were made for future work. Ideas or wider feedback are welcomed to [mary.forsythe@metoffice.gov.uk](mailto:mary.forsythe@metoffice.gov.uk) and [James.cotton@metoffice.gov.uk](mailto:James.cotton@metoffice.gov.uk).

**Recommendation IWW16-WG2-7** Mary Forsythe: to produce a draft of how a log could work and to share via the iwwg email list.

## 7) Short items

### Climate studies

- **WG2 supports the plans for harmonisation of AMV CDR between producers ( e.g. create a CDR once the GEOring will be available).**
- WG2 noted the ideas for specific climate studies to explore jet stream or monsoon location/trends. We don't have the right people at the winds workshops to more fully discuss who or how this could be pursued.
- Ad Stoffelen noted plans for studying the use of scatterometer winds for climate and that they have climate participation within the surface winds community.
- It may be useful to pursue a funded study to evaluate the potential of AMV studies in climate as an initial step before engaging more widely with the climate community.
- Regis noted the potential to produce AMVs from dust and other aerosols and asked whether there is NWP interest. We encourage NWP centres to consider this proposal further.

## 7) Short items

### Surface winds - recommendations following plenary discussion

- Most NWP centres plan to assimilate the full scatterometer constellation.
- The WG noted the idea to test approaches to manage the large geographical model biases in NWP data assimilation and to test assimilation at higher resolution with inflated errors.
- Ad noted plans to produce coastal winds for all scatterometers
- The WG noted work on GNSS-R winds as an additional source of ocean surface wind speed and looks ahead to the results of further studies to evaluate how this could contribute to NWP skill.

**Recommendation IWW16-WG2-8** NWP centres encouraged to test assimilation of full scatterometer constellation and to consider handling of large geographical model biases (see Ad's talk for more details).

**Recommendation IWW16-WG2-9** For consideration by CGMS the consolidation of in-situ high wind speed reference for scatterometer calibration.

**Recommendation IWW16-WG2-10** For consideration by CGMS optimizing the timeliness of scatterometer data.

## 7) Short items

### Thoughts on upcoming AMV changes

- Meteosat-12
- Loss of MODIS/NOAA polar winds
- Idea for full multi-polar AMVs (Javier's talk)
- Extra polar channels, SWIR, day-night
- Derivation updates – how best to manage these efficiently?
- Higher volume datasets

This topic was discussed only briefly. NCEP expressed a preference to keep MODIS AMVs as long as possible due to their long continuous record. There is a general preference to continue ground segment support for older polar platforms.

**Recommendation IWW16-WG2-11** to satellite providers: to consider continuing to operate the ground segment for polar platforms as long as the sensing instruments perform adequately. They often continue to provide valuable information for NWP, particularly as the drifting orbits can provide unique coverage.

**Recommendation IWW16-WG2-12** to NWP centres to consider exchanging results via email on new datasets or changes to existing datasets.

## 7) Short items

### Feedback on IWW16

**WG2 appreciated the guidance from CGMS, the hard work of the workshop co-chairs, host and organizers before and during IWW16.**

**The feedback on the workshop was positive. Both in-person and virtual attendees felt the hybrid format worked well.** It enabled extra people to participate (~25 online) who wouldn't otherwise have attended. It was recognized that people are not always able to attend in person due to personal or health reasons, but also that carbon budgets are now limiting travel at some centres. It was acknowledged the extra effort involved to support this approach and recognized it may not always be possible in the future. It was suggested to consider the option of a minimal hybrid format if this could help reduce effort, whilst retaining some of the benefits.

**A comment was raised that we could explore whether there is the option of more admin support** (potentially funded) to ease the organization of the workshops.

**Action IWW16-WG2-2** On Iliana Genkova: to follow up with the TOVS group on their arrangement for admin support and consider whether this could be helpful for future IWWG meetings.

## 8) Any other business

**Jeff Key asked for feedback on the continued usefulness of the polar direct broadcast winds.**

These have been very helpful to provide more timely data for use in NWP assimilation. They have been assimilated at the UK Met Office for many years, but are not currently used here or elsewhere. The data has become less important overtime with the move from triplets to pairs for some datasets and the use of additional Antarctic data downlinks. The example below shows the current timeliness of Metop-B winds from EUMETSAT. Whilst the specific need for direct broadcast is less, we encourage AMV producers to consider using image pairs and other approaches to improve timeliness.

