



Current and Planned Activities of the International Winds Working Group

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Outline

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- **IWW11 Top Recommendations**
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International Winds Working Group (IWWG)

- Established in 1991 and became a formal working group of the Coordination Group for Meteorological Satellites (CGMS) in 1994.
 - Currently 50-60 active members.
 - IWWG web site/wiki: <http://cimss.ssec.wisc.edu/iwwg/iwwg.html>
- Provides a forum to discuss and coordinate operational and research developments in satellite-derived wind data production, verification/validation procedures, and assimilation techniques.
 - Geostationary and polar imagery (clouds and water vapor)
 - Radar backscatter & conical microwave radiometers (ocean surface winds)
 - Research instruments (ie., MISR)
 - Future instruments (advanced imagers, space-borne LIDAR, Geo-Hyperspectral)

Highlights from IWW11 (Feb 2012)

- Hosted by the University of Auckland, New Zealand (**Local Host: Roger Davies**)
- Co-chaired by Jaime Daniels , Régis Borde
- Attended by 56 scientists
- NWP representation the best ever
- **Covered:**
 - Updates on operational products
 - Latest developments in AMV derivation, characterisation, NWP applications
 - One session focussed on MISR winds
 - One session focussed on Doppler Wind Lidar
- **In addition to usual WGs, held focused group discussions on:**
 - NWP winds impact study and high resolution winds
 - AMV intercomparison plan and simulated data studies
 - AMV open source software



Top Recommendations from IWW11

- **IWW11.1.** All AMV producing centres are encouraged to investigate how to provide enhanced ***situation-dependent error estimates of wind and pressure with new AMV derivation techniques***. NWP centers encouraged to work with producers on the evaluation
- **IWW11.2.** A second ***AMV derivation inter-comparison project*** should be carried out and the results presented at IWW12 in 2014
- **IWW11.3.** IWWG co-chairs to kick-off an activity to pull together the latest research on ***high resolution wind production and usage*** and to encourage increased focus on this theme at IWW12. This will involve input from NWP centers (to investigate need for this data in high resolution models and how best to assimilate) and data producers (how best to adapt the derivation).
- **IWW11.4.** Satellite providers should investigate the potential of ***global AMVs from tandem satellites***: dual Metop, MODIS/VIIRS, and the future Sentinel 3A/B.

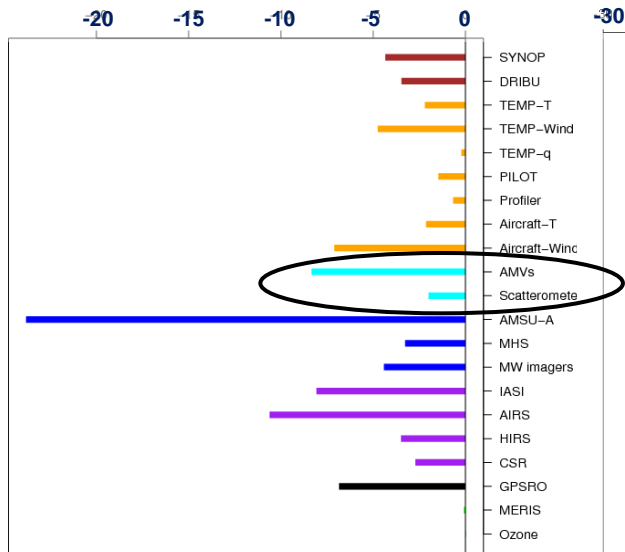
Recent IWWG Achievements

- Completion of a 2nd NWP winds impact study (undertaken in 2011-12)
- Number of new or improved satellite wind derivation schemes
- AMV simulated data studies (ECMWF:2011-12, University of Reading – ongoing)
- Development (via NWC SAF) of a community-based AMV software package to support research efforts (ongoing)
- AMV reprocessing capabilities achieved by numerous satellite operators (EUMETSAT, JMA,) – supports SCOPE-CM effort

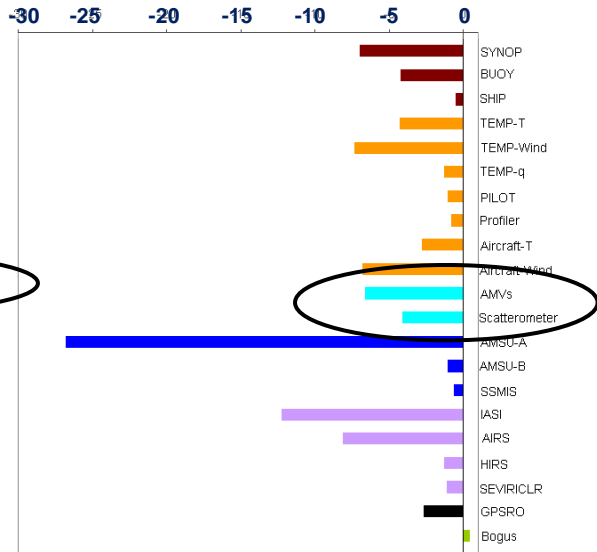
Coordinated Study of Winds Impact

Highlights...

- **Second NWP Impact Study Undertaken (Two seasons)**
 - Participating Centers: DWD, ECMWF, JMA, KMA, Meteo-France, NRL, UKMO
- **Forecast Sensitivity to Observations (FSO) – Adjoint Tools**
 - Adjoint-based FSO method gives estimate of the contribution of each observation towards reducing the 24-hour forecast error
 - Impact results among centers agree fairly well : **AMV FSO of 7-11%; Scatterometer FSO 3-5%**

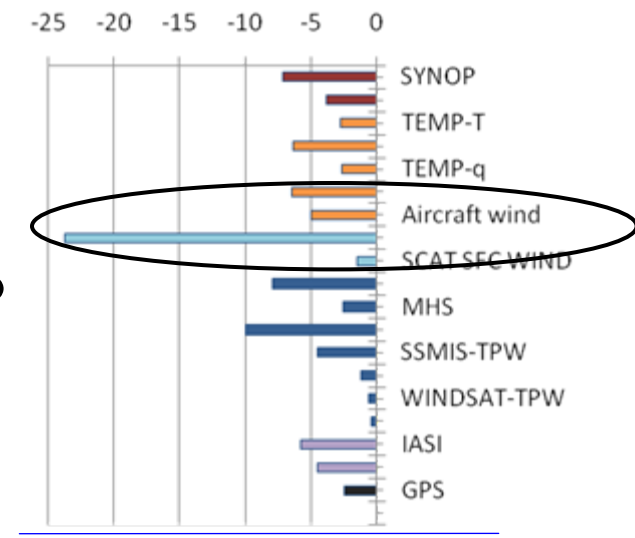


ECMWF



Met Office

Geneva, Switzerland



NRL

Coordinated Study of AMV Impact

Conclusions...

- *Positive forecast impact is seen from AMVs across all NWP centers* especially in upper troposphere;
- AMVs generally turn out to be in the top five most important contributors for the NWP centers
- Nearly all NWP centers show AMVs have a strong impact on the tropical mean wind analysis
- Larger impact often seen for centers who use 3DVAR or use fewer other observations, and for NRL whose FSO statistics suggest quite a different impact from the various components of the observing system
- No geographical regions where the AMVs are performing consistently poorly among several centers.
- In addition to the classic denial study, *the FSO statistics further indicate significant relative importance of the AMVs in the global observing system context*

Final report on IWWG web page under “Latest News” Section

ET-SUP-7, May 2013,
Geneva, Switzerland

Improving Satellite Winds

Where the current efforts are focused...

- **Improving coverage**

- Multi-satellite winds (*LEO/GEO, LEO/LEO*)
- Higher resolution products (*spatial, temporal*)
- Higher product refresh rates (*hourly GEO*)
- Reduced latency

- **New/emerging wind derivation schemes**

- Future advanced imagers (*GOES-R ABI, MTG, AHI, Geo-KOMPSAT-2, FY4*)
- Future GEO hyperspectral sounders (*MTG, FY4*)
- Multi-satellite LEO Winds: (*Metop-A/B, Terra/Aqua, NOAA/AVHRR, VIIRS*)
- Multi-satellite GEO/LEO Winds
- ADM-Aeolus: Global vertical wind profiles
- Synergistic use of LEO hyperspectral instruments for GEO AMV height assignment
- MISR cloud motion winds: higher resolution, reduced latency
- Higher resolution scatterometer winds

Improving Satellite Winds (*cont'd*)

Where the current efforts are focused...

- **Second AMV Intercomparison Study**
 - Test datasets generated and made available to IWWG members (Oct 2012)
 - Participants have successfully generated AMV datasets from test data (*Brazil Met.Service, P.R.China Met.Service, EUMETSAT, Japan Met.Service, R.Korea Met.Service, NOAA/NESDIS, NWCSAF*)
 - Analysis and comparisons is currently being done via support obtained from the NWC SAF Visiting Scientist Program. (Results will be reported at IWW12)
- **High Resolution Wind Datasets**
 - Recognized by IWWG as one of the key new areas to focus on
 - **Goal: Improve forecasts of high impact weather events**
 - Capture/utilize smaller scale motion observed in high resolution geostationary imagery (e.g., *clearly evident in rapid-scan animations*)
 - NWP/data assimilation improvements to use these datasets
 - Supporting AMV Simulation Studies
 - Future satellites, new instruments, new approaches for deriving atmospheric winds
 - **IWWG co-chairs kicking off a focused and coordinated effort involving NWP centers and data producers to address this**