Report from the Working Group on AMV Characteristics (WG-3)

Chairpersons: Steve Wanzong, Arthur de Smet

Working group 3 discussed several topics related to AMV characteristics. Many of the discussion topics were motivated by Johannes Schmetz's and Jean-Noël Thépaut's plenary discussion: Recommendations from CGMS33 and a 'fresh look' at AMV research and development.

Geometric approaches to height assignment have been recognized for quite a long time now, but are not used routinely by any of the main wind producers. The upcoming changes in the constellation of geostationary satellites provide interesting opportunities to apply stereo height assignment. The Chinese have shown an interest to do so with the FY-2C and FY-2D satellites. The FY-2C satellite is currently operated with a nominal sub-satellite longitude of 105° E, the FY-2D one is due to be launched in Autumn 2006, with a nominal sub-satellite longitude close to 88° E. The Meteosat satellites will be repositioned in the course of 2006 and early 2007. Meteosat 5 will be de-orbited; its position, at 63° E above the Indian Ocean, will then be taken over by Meteosat 6. Meteosat 8 will remain the primary operational satellite, with Meteosat 9 as backup. Meteosat 7 will move to 58° E during the second half of 2006. It is recognized by EUMETSAT that this will provide opportunities to perform stereo height assignment.

A geometric-based shadow technique for clouds in the visible spectrum will be investigated by visiting scientist Feng Lu at CIMSS. This technique will work with a single satellite. However, his first task, to be reported on within 6 months, is to define the optimal configuration for stereo applications from multiple satellite platforms. Specifically, what is the optimal separation distance between satellites to maximize stereo viewing coverage and AMV height assignment quality?

Recommendation (IWW8_WG3_1): For all AMV producers: Investigate the possibilities to derive and test stereo heights, based on the future constellation of geostationary satellites.

The working group members recognized the availability of six years of MISR data, constituting high quality stereo heights.

Recommendation (IWW8_WG3_2): Satellite operators and others to use MISR stereo heights for comparison studies.

The Numerical Weather Prediction (NWP) community continues tove a clear need to obtain better estimates of AMVheight assignment uncertainties. They urge the AMV researchers and producers to develop metrics that provide such estimates.

Recommendation (IWW8_WG3_3): AMV researchers and producers should make it a top priority to develop metrics or quality indicators that provide better estimates of the height assignment uncertainties.

The working group members were enthusiastic about the idea, brought forward by Jo Schmetz and Jean-Noël Thépaut, to inter-compare the various height assignment methods used by the different AMV producers. They suggested that all AMV producers use the same data sets (satellite data and background guess fields) to derive AMV heights. EUMETSAT will then gather the AMV and height assignment data for further analysis. The members agreed to use satellite data from the operational Meteosat satellite.

Recommendation (IWW8_WG3_4): AMV producers are requested to derive winds from a selected data set, using imagery from the operational Meteosat satellite.

NESDIS and CIMSS are studying the potential of a new quality indicator, the Expected Error (EE). This index combines the classic Quality Indicator (QI) with other selected tests in a regression scheme to obtain a better indicator of the AMV quality. Th EE is planned to become operational later this year for all NESDIS-produced AMVs. Other AMV producers should look into the use of the EE as an additional quality measure.

Recommendation (IWW8_WG3_5): AMV producers to derive and test the Expected Error (EE) as an additional measure of AMV quality.

The final quality of each AMV is determined by the quality of the individual processing steps, which are the following:
a) Navigation and registration,
b) Scene selection,
c) Tracking,
d) Height assignment.
It is not clear to what extent the AMV producers take all processing steps into account when deriving the final AMV quality.

Recommendation (IWW8_WG3_6): AMV producers should ensure that the AMV quality reflects the quality of all derivation steps:
a) Navigation and registration,
b) Scene selection,
c) Tracking,
d) Height assignment.
A quality indicator for each step in AMV production is needed.

The working group members stressed once again the need to encourage the development of forecast independent height assignment methods. EUMETSAT indicated its willingness to look into the use of the so-called IR-2-WV method, which yields heights that are less dependent on the forecast profile.

Recommendation (IWW8_WG3_7): EUMETSAT to revisit the use of the IR-2-WV method as a method that is less dependent on the forecast data

The working group discussed AMV production at different scales. CIMSS is experimenting with the derivation of mesoscale winds for aviation forecasting. It involves a slightly different approach for AMV processing strategies and quality control. It has been developed to capture detailed flows within and near convective storms in the visible, water vapor, and IR window channels from GOES-12. CPTEC is interested in deriving mesoscale wind fields over South American on a routine basis once GOES-10 becomes available.

Recommendation (IWW8_WG3_8): CIMSS and CPTEC continue to investigate mesoscale wind production and evaluation. Reports on these efforts should be shared at the next IWW. For CPTEC, this is dependant on the GOES-10 move to 60W for South American support.

The working group was unclear as to how the various global NWP centers use the AMV quality indicators currently provided by the AMV producers. In particular: the QI and RFF indices, QI with/without forecast test, and other indicators or thresholds?

Recommendation (IWW8_WG3_9): EUMETSAT is to poll the NWP centers and users of AMV data on their specific use of the quality indicators provided by the operational AMV producers.