REPORT FROM WORKING GROUP I : AMV EXTRACTION METHODS

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This working group reviewed the progress made in AMV extraction methods and related topics since the Seventh International Winds Workshop in Helsinki, 2004, and also examined recommendations from CGMS 33. It made recommendations based on recent developments in this field.

ACHIEVEMENTS NOTED SINCE THE 7TH INTERNATIONAL WINDS WORKSHOP

Some interesting papers have been published recently that relate to techniques. The most recent of these include (in what must be an incomplete list):

1. Seiz et al. (2006) have published cloud height comparison from ASTER and MISR, showing how geometric height retrievals are affected by winds.

2. GLAS (lidar) heights, currently compared with heights derived from infrared techniques (Sèze), were investigated by Berthier et al. (2004).

3. MODIS and MISR height retrievals have been compared with lidar by Naud et al (2004, 2005).

There have been many interesting findings reported by various groups, including:

1. Oxygen-A band retrievals have been compared with MERIS/MISR/MODIS by Fischer.

2. MISR satellite measurements of wind and cloud height have been compared with information from surface sites by Marchand.

3. Seiz et al. have used Meteosat 5/7 to confirm the need for very accurate navigation. Implications for accurate co-registration.

4. CMA has pioneered navigational techniques, independent of land control points. These are now also being used by NESDIS.

5. Divergence/mesoscale features from UTH and cloud have demonstrated the potential for better understanding of fluid flow.

6. MSG IR 12 µm radiances have been found to be better than 10.8 µm radiances for height assignment (possibly associated to 13.4 µm radiances).

7. Borde has demonstrated that tracking must be consistent with the height assignment (i.e. for the same pixels).

8. ECMWF has demonstrated the use of synthetic satellite images at 10 km resolution from model output with RTTOV.

9. CIMSS has simulated GOES-R ABI.

10. MISR winds have reached maturity, and have been compared against forecast winds.

11. A homogeneous, 6-year data set of height-resolved winds from MISR, useful for climate and reanalysis studies is now available.

12. A 2D Fourier phase analysis technique has been demonstrated for AMV extraction of high temporal resolution winds.

13. MODIS winds are now available through GTS and at direct broadcast sites.

14. Proof of concept for height-resolved AMVs from sounders (GOES) has been demonstrated.

RECOMMENDATIONS FROM WORKING GROUP I

The two most significant recommendations were:

1. That studies which use accurate (temperature independent) height assignments, such as lidar- or multi-angle-based, together with the operational retrievals be strongly encouraged. Specifically, Terra and A-Train vs. geostationary.

2. That the general capability of retrieving polar winds be maintained and secured for the future (multi-angle viewing satellite, Molniya orbit-type satellite, polar orbiters).

The following were strongly recommended:

3. That quality indicators, which appear to be moving on the right track, also include height information. Quality indicators for different processing steps should remain separated, and should have a unified definition for all AMV producers. Ideally, the product should be as similar as possible.

4. That a comparison of height assignments using different methods be applied to a common reference dataset (e.g. Meteosat 8).

5. That studies explaining discrepancies between different height assignment methods, involving investigation of the physics, be encouraged.

The following recommendations were deemed important, in no particular order:

6. That newly demonstrated techniques be incorporated into existing methodology to improve navigation, scene identification, target selection, wind extraction, and height assignment.

7. That diagnostic tools be developed to evaluate products affecting tropical convective parameterization and to encourage the creation of longer-term divergence products by reprocessing.

8. That studies involving the tracking of synthetic images produced by high-resolution NWP models be continued.

9. That the IWW community attempt to engage related scientific communities (e.g. clouds). This could take the form of a presentation of the IWW results to meetings of other communities or invitation of experts from these communities.

10. That the influence of forecast data be reduced as much as possible in the determination of AMVs.

11. That known calibration biases be removed before processing multispectral data.

12. That studies on the representative height or layer associated with the motion, and the conditions which affect this relationship, be encouraged.

13. That users be encouraged to evaluate AMVs in comparison with new data (ADM-AEOLUS, CALIPSO) as these become available.

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