

# REPORT FROM THE WORKING GROUP ON METHODS (WG I)

*Chairperson: Chris Velden*

The ten-member working group on satellite-derived wind tracking methods discussed a wide range of topics. The “top ten” list of issues or research areas is presented below. Some of these topics are new, while others are re-emphasized from the IWW4 recommendations. The group felt an overarching issue was that with a growing AMV producer and user community, communication of new ideas and methods to extract wind data is increasingly essential to maintain uniform vector field quality and understanding of the data properties.

- 1) Standardization of processing methods by the global operational wind producing community. This includes tracking and height assignment methodology as well as unified quality control indicators. Promising new techniques from proven research studies should be introduced at IWWs for consideration of implementation by the operational wind producing centers. Code exchange is highly encouraged. The group also recommended convergence of the geostationary satellite observing system in regards to common imaging channels/frequencies for global winds production.
- 2) International strategies for creating more rapid scan (RS) capabilities. The group endorsed the recommendation to satellite agencies to create scanning strategies that allow RS scheduling on a more routine basis. Preliminary studies have shown the increased vector yield and quality from more frequent imaging, and the applications (e.g., tropical storms, mesoscale analyses). Further studies are encouraged to solidify the relationship between optimal scan frequency vs. spectral band and resolution, and explore the value of multiple RS image tracking (more than three images in the tracking loop). The GOES-L science checkout period can be used to design scan strategies.
- 3) Improvement in the specifications and performance of image navigation/registration. The production of RS winds at high resolution and use of sophisticated geometric height assignment techniques demand higher accuracy in image navigation and registration. The group re-emphasizes the recommendation from the WG of IWW4 for registration and navigation accuracy to be better than 1km for accurate RS wind determinations.
- 4) Focussed research on the speed bias problems. The slow bias in satellite-derived cloud-tracked vectors in the upper levels still exists, and is being treated by quality control or statistically-based increments. Clear sky water vapor winds at mid levels are also showing a slow bias, especially with GOES. The WG encourages further research into these problems and/or their solutions.
- 5) Vector derivation over land areas. Cloud-tracked winds over land areas offer increased difficulties. The WG endorses research into the scanning strategies (RS?) and processing/QC adjustments necessary to create vector fields over land with accuracy equal to marine regions.
- 6) Lessen the dependence on model first-guess information. This is a follow-up from IWW4. Methods are desired to derive displacement vectors, assign heights and QC with minimal influence of model-dependent fields.
- 7) Expand research on the use of other spectral bands for winds processing. The GOES 3.9 micron channel has demonstrated promise for nighttime low-level vector determinations. Other planned satellite launches will contain this channel and new channels will have the same capability. Exploitation of these spectral bands for winds is encouraged.
- 8) Continue to explore and refine wind derivations from microwave frequencies. The success of scatterometer winds and their use has been documented. Similar advances have been made in derivation of winds from SSM/I, SAR and AMSU. The WG acknowledges this new methodology

and endorses the continued efforts to extract winds from polar-orbiter microwave information and improve the algorithms.

- 9) Improvements in vector height assignment methods. This is a long-standing issue with AMV. Exploration into new methods to improve the height assignment accuracy should be continued, as well as data characterization studies (i.e. the representativeness of clear sky WV winds).
- 10) Investigation of tracking methodology. Preliminary work suggests correlation tracking is optimal in some cases, and the Euclidean distance method in others. New, more sophisticated methods (model-free) may lead to increased tracking accuracy. The WG recommends additional research in this area.

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