

REPORT FROM THE WORKING GROUP ON METHODS

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This Working Group reviewed the current methods used in the generation of operational satellite tracked winds and discussed the improvements that seem to be in reach based on the papers presented at the workshop. Twelve workshop participants contributed to the intense Working Group discussions. The Working Group worked along items suggested by CGMS. Those items are repeated for convenience followed by the general discussion of Working Groups and the recommendations.

CGMS 1) Requesting wind operators to assess the appropriate use of wind forecast data in the production of winds;

This topic raised a rather controversial discussion. The WG recognised the success of wind derivation methods that also rely on forecast data however, it also pointed out the danger of deleting new information contained in the data in areas where the forecast is wrong. Previous success of using forecast winds was mainly due to the riddance of a few rogue winds, but also due to autoediting (height re-assignment) of winds on the basis of forecast information. The autoediting was considered as a potential problem source if it relied too heavily on forecasts.

WG1-R1: Minimize the use of the wind forecast at the production level.

WG1-R2: Request a report from the satellite operators for the physical and scientific reasons behind the use of forecast data in wind production.

WG1-R3: For research studies into the tracking of clear-sky WV feature the Working Group suggested that model forecast fields provide a complete and consistent data set for studies of the relationship between the displacement of WV features and the wind. This would require the simulation of WV images from model temperature and humidity fields. The use of model output to better understanding of the displacement of volume features is encouraged.

CGMS 2) Developing methods to assign "quality flags" to individual winds;

Considerable progress since the last Winds Workshop was noted in the derivation of objective quality flags assigned to individual tracers.

The Working Group recognized that the meaning of quality flags depends on the utilization of the data (e.g. whether used as single level wind). That is the qualification of a wind vector in terms of "good" or "bad" is based on the feedback from the users at NWP centers. The development of objective quality flags by satellite wind producers will be the first step in that process.

WG1-R4: Operators should continue work on the development of quality flags of winds based primarily on satellite image data. They should strive to develop consistent QF between operators.

WG1-R5: The Working Group encouraged the operational implementation of quality flags: Especially toward NWP needs.

Additional research is needed to automate the above mentioned identification process.

WG1-R6: The Working Group identified the need to further segregate the cloud motion vectors according to meteorological conditions, e.g.

- areas of deep convection
- areas of strong divergence
- cloud type and phase

WG1-R7: Quality flags should include information on manual or automatic intervention, e.g. height reassignment through manual editing or an auto editor

WG1-R8: In addition information should be provided on the temporal and spatial resolution and channel used for satellite tracked winds.

CGMS 3) Requesting wind operators to improve coverage of the wind product whilst preserving an acceptable quality of the product;

CGMS 5) Investigating, and proposing, the generation of wind products with improved temporal and spatial resolution;

Both items were discussed together since they address the same problem. The items were considered as very important to further enhance the impact of satellite tracked winds in forecast models. The recommendations are directed to all satellite wind producers, however it was recognised that current performances of operational systems are quite different from each other.

WG1-R9: Increase the number of winds within current processing area however at the same time maintaining the quality.

WG1-R10: Increase the processing area toward the limb. This will require new research.

WG1-R11: Increase the number of winds over land. This will necessitate shorter imaging intervals since low-level cloud over land tracers are usually short-lived.

WG1-R12: Improve the utilization of the current system and the performance of algorithms:

- e.g. - improve height assignment with the WV intercept method
- consider novel tracking techniques
- consider fuzzy rule based techniques for the derivation of satellite tracked wind

WG1-R13: It is recommended that research modes are considered in operations to help define future operations, e.g once per day 15 minutes scanning interval over a smaller area could be considered instead of a 30 minutes interval.

The Group emphasized that the use of a research mode in operations is no contradiction since it will pave the way for an efficient transition of the research results into a truly operational mode. A specific point raised was the lack of satellite winds near the center of tropical storms. Research studies as well as current operational practice at JMA (15 minute intervals for VIS winds around typhoons) clearly show the potential of shorter image intervals.

CGMS 13) **Producing a summary of the product development plans of all wind operators;**

WG1-R14: All wind operators should provide a summary of future development plans, short and long term. In addition a description of current systems is also suggested (including image registration).

WG1-R15: The group recognizes the increased need for an **open exchange of ideas**. It has been suggested to create a well defined data set for the derivation of winds, that will be available to all interested scientists. Results from different **investigations on the common data set** will be exchanged and differences will be investigated. A sub-group will commence work on the definition initial data set. We hope this will lead to a global "**virtual laboratory**" exploiting the increased capabilities of modern communication system.