

PANEL DISCUSSION

Chairperson: W. L. Smith

This session focused on the key issues involved in the production and quality control of cloud and water vapor motion "wind" data. There was a very lively discussion which resulted in several important recommendations. The issues discussed and a short summary of the conclusions are provided below.

Target Selection

The definition of proper tracers for wind determination remains a significant problem due to the relatively long time period between satellite images (i.e., 30 minutes). It was recognized, based upon previous pilot demonstrations, that many more suitable targets (i.e., clouds whose characteristics remain constant during the period between successive images) can be achieved with shorter interval sequences (e.g., 15 minutes rather than 30 minutes). In order to retain the signal to noise ratio of the vector determination, a sequence over more time intervals (e.g., 4 fifteen minute intervals rather than two 30 minute intervals) would need to be achieved. Although the total daily earth viewing time budget of the sensor remains the same, the instrument operating scenario changes to one of sector scanning for each hour, achieving full disk coverage after several hours. The panel (i.e., participants) were unanimous in their belief that this change in data acquisition would both increase the density as well as improve the quality of cloud motion winds.

Tracking Algorithm

Both automated auto-correlation and single pixel tracking were discussed. The participants were in general agreement that the bulk of the data production should be performed using fully automated (i.e., autocorrelation) techniques with manual enhancement being possible in more difficult baroclinic (i.e., complex cloud) situations as much as schedule and resources allowed. There was a lively discussion on whether or not to use wind fields produced by NWF models as constraints in the wind production process. No consensus of opinion was achieved on this issue.

Height Assignment

The participants recognized that the major source of problem in the use of cloud motion wind data is due to the errors in cloud height assignment. Although absorption channel methods are now being used to minimize these errors, problems still arise in thin Jet Stream Cirrus situations where small height errors can be equivalent to large vector errors due to the large vertical shear associated with Jet Streams. Stereo techniques using synchronized scans of neighboring geostationary satellites and/or scans synchronized with the underflight of polar orbiting satellites would alleviate much of these height assignment errors for the most critical upper level Jet Stream wind

regimes. The participants were concerned by the fact that the operational satellite centers have not yet implemented a coordinated approach which would enable Stereo methods to be used.

Quality Control

The main discussion focused on the use of automated versus manual methods. It was unanimously concluded that purely objective methods are not yet developed to a level which precludes a final manual editing and enhancement of the product. Once again a debate ensued as to whether any bias in the editing should be included through the use of NWP products. No unanimous conclusion was reached on this point although it was generally agreed that if the same overall quality could be achieved independent of NWP products, the data would have more positive impact on numerical analysis/forecast systems.

Horizontal Resolution

The trend towards higher spatial resolution infrared instruments was recognized to be very important for future improvements in cloud motion products.

Vertical Resolution

It was suggested that vertical resolution of water vapor tracked winds could be improved with future instrumentation which enabled water vapor to be defined in as many as 10 narrow vertical layers. Advanced infrared sounding instruments proposed for future Geostationary satellites would permit such a capability thereby providing wind "profiles" above cloud levels.

The session concluded with three specific recommendations:

- (1) A new instrument operation scenario be instituted to provide short time (e.g. 15 minute) imagery over hourly periods for improving global cloud motion wind determinations.
- (2) An international working group be formed to specify a "standard" set of quality indicators (expected errors) to be provided with wind vectors provided by operational centers.
- (3) A pilot study be conducted, using METEOSAT 3 & 4, to demonstrate the operational utility of stereo cloud height information achieved from the synchronization of the scans of the international complement of geostationary satellite instruments.

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