

## REPORT FROM THE WORKING GROUP ON UTILISATION (WG II)

*Chairmen: John Le Marshall and Graeme Kelly*

A record of steady expansion in the application of Atmospheric Motion Vectors (AMVs) was seen at the Workshop. Of note was significant improvement in the forecasting of tropical cyclones from the use high resolution winds and continuous assimilation techniques. The analysis of the development of convective clusters was also shown to be assisted by use of upper level high-density cloud and water vapour drift winds. Positive impact on NWP, particularly in the tropics is now firmly established.

### 1. Climatological Applications and Reanalysis

Because of the importance of reanalysis to climate studies and seasonal forecasting, and the clear benefits from the re-examination of the attributes of the winds in this activity, *there is a requirement to reprocess AMV data using current methodologies.*

**Recommendation:** As a result of the demonstrated importance of reanalysis to climate studies and seasonal forecasting, the reprocessing of AMV data using current methodologies should be undertaken.

### 2. Application to NWP

Of note at this workshop was the significant improvement in the forecasting tropical cyclones from the use of high resolution winds and continuous assimilation techniques and the demonstration of the benefits of AMVs to operational forecasting.

#### *Use of Winds at NWP Centres:*

Extensive use of AMVs is currently undertaken in most NWP centres and has been summarised in a document to be placed on the home page of a satellite operation centre or WMO.

**Recommendation:** Major NWP centres inform the WMO of any changes needed to the document. The centres will be notified of this recommendation .

NWP will benefit from provision of consistent AMV data sets, regular in time and space. To achieve this full disk wind data needs be available at least every six hours, and if possible more frequently. In addition development needs to be undertaken to improve coverage over land.

Currently the winds from the scatterometer onboard ERS-2 has proved to be the one of the best data sources in positioning tropical cyclones for NWP. This data needs to be available in a timely fashion on the GTS and in addition data from Quikscat, which will be launched in the near future, need to be made available. Data from these research satellites will be required at least until operational satellites become available beginning with METOP. These data

should be made available to all WMO members.

Because of the advantages of full wind profiles research related to the provision of space based wind profiles (LIDAR work) is encouraged.

Use of BUFR format is appropriate for AMV data dissemination and we suggest users to switch to it. Software and support for this are available from ECMWF and NCEP. In the initial part of the changeover parallel BUFR and SATOB use is encouraged.

The availability of a Notice Board giving information on satellite products and any changes in production methods or format is recommended.

### **Recommendations:**

- That full disk high resolution wind data sets be available at least every six hours but preferably more frequently.
- That research be undertaken to optimise the estimation of AMVs over land.
- Research Scatterometer data be available to operational NWP centres on a routine and timely basis.
- Research related to the provision of space based wind profiles (LIDAR work) is encouraged.
- Noting BUFR is appropriate for geostationary satellite data we recommend users to switch to it. It enables the inclusion of extra information about the wind and quality for the NWP analysis. Initially parallel BUFR and SATOB dissemination is encouraged to ensure a smooth transition.
- A notice board giving satellite product status and any changes in production methods or format, which can be accessed through the WMO satellite page, is recommended.

### 3. Application to Nowcasting

Mesoscale systems generally produce good upper level traces and monitoring their evolution is important for nowcasting.

It is important to produce winds as frequently as possible. This may depend on the satellite operator but should be less than every 30 minutes. The resolution should be improved (spatial/temporal) over NWP requirements and winds possibly of lower quality should be included, with a quality flag.

Dissemination needs to be timely and in a form useful to nowcasters. If nothing appropriate can be found for dissemination in the short term, using media such as the GTS or MDD for example, then WEB pages may offer a solution. Work to incorporate these winds into Nowcasting systems needs to be encouraged and assisted, such that real-time wind fields can

be produced locally.

**Recommendation:** Nowcasting wind products need to be developed and their integration into nowcasting systems is strongly endorsed.

#### 4. AMV Research

Tracking with data from new channels such as the 3.9 micron channel may be an important source of new information. Development work in this area particularly relating to the use of hyperspectral data needs to be encouraged.

In addition, work is required on understanding both the horizontal and vertical scale represented by the AMVs.

Additional AMVs need to be provided in support of field experiments. This work will support research required to optimise future use of these vectors. Also provision of additional vectors over land needs to be addressed in order to improve the utilisation of satellite data over land.

#### 5. Education and Training

Optimal utilisation of AMVs requires an effective education and training program. Information related to applications should be accessible via the Web.

The use of the so called 'virtual laboratory' concept for training and distributing training material is encouraged. It would be very useful particularly for developing nations. In the longer term the setting up of a virtual laboratory, e.g. at regional training centres, may be of great assistance to the education and training program.

**Recommendation:** Emphasis needs to be given to education and training. In the short term material relating to application of AMVs should be collected and accessed by the WMO satellite page.