

SUMMARY OF THE FOURTH INTERNATIONAL WINDS WORKSHOP

The Fourth International Winds Workshop was held in Saanenmöser, Switzerland from 20 - 23 October 1998. The Workshop was organised by EUMETSAT (the European Organisation for the Exploitation of Meteorological Satellites), and the WMO (World Meteorological Organisation) organised the excellent workshop facilities.

Thirty-eight scientists attended IWW4. Fourteen countries and four international organisations were represented at the meeting: Australia, Austria, Brazil, China, France, Germany, India, Japan, Kenya, The Netherlands, Spain, Switzerland, United Kingdom, United States of America and ECMWF (European Centre for Medium Range Weather Forecasts), WMO, ESA (European Space Agency) and EUMETSAT. It is noteworthy that most meteorological satellite operators, most NWP centres, and scientists representing both the research and user communities working in this field from around the world participated in IWW4.

The Winds Workshops provide a forum for data providers and users to share information on the characteristics of satellite tracked winds and to optimise their use in NWP. At the first workshop in Washington, DC, it was recognised that satellite tracked winds were based initially on the simple process of identifying a feature (e.g., a cloud) in a satellite image, tracking that feature in a sequence of images, and estimating the height of that feature in the atmosphere. Such a satellite tracked wind was interpreted as a report of atmospheric motion at a single level. Correct height assignment was identified as crucial. At the second workshop in Tokyo, Japan improvements in height assignment techniques were presented, grouping of water vapour winds into clear and cloudy sky conditions was encouraged, and motion estimation from more closely time sequenced images was investigated. It was concluded that proper utilisation of satellite tracked winds to depict atmospheric motion must distinguish between single level cloud motion and mean layer water vapour motion. At the third workshop in Ascona, Switzerland, a new standardised reporting method was recommended for evaluation of operational wind production quality and several algorithms for assessing wind vector quality were discussed.

The CGMS at its meeting in July 1998 recommended that the Fourth International Winds Workshop make a record of their accomplishments in the context of CGMS priorities and review the scope of their future meetings. In addition it was noted that utilisation of the information contained in satellite tracked wind fields by NWP remains a major challenge; IWW4 was encouraged to continue their discussions of this important issue. Some specific issues were suggested for discussion: a) optimum scan intervals for tracking features; b) consensus on wind vector quality indicators; c) utilisation of high density winds; d) exchange of wind data in binary unified format records (BUFR); e) water vapour winds in NWP versus direct assimilation of water vapour radiances; f) climatological applications of reprocessed wind data sets; g) nowcasting applications of real time wind data sets; h) evolution of current geostationary systems; and i) the role of satellite winds in the context of all motion

observations (scatterometer, Doppler lidar, passive microwave surface winds, etc.). These items were taken up by the working groups and discussed in the plenary; results are presented in their reports.

The workshop participants were welcomed by Dr. Tillmann Mohr, Director of EUMETSAT. His opening remarks mentioned the improvements in the space observing system since the last Winds Workshop in 1996; these include the launch of the Meteosat-7 and the utilisation of Meteosat-5 over the Indian Ocean as well as the continuing good performance of the winds from the geostationary satellites of NOAA/NESDIS (National Oceanic and Atmospheric Administration/ National Environmental Satellite, Data, and Information Service), Geostationary Operational Environmental Satellite (GOES)-8 and -10, and of the Japanese Meteorological Agency (JMA) Geostationary Meteorological Satellite (GMS)-5. He noted that this workshop was widening the agenda to include surface winds from microwave sensors on-board polar satellites. He encouraged the workshop participants to focus on the important issues suggested by the CGMS.

The Workshop proceeded with six plenary sessions. The first session on current systems to derive atmospheric motion vectors (AMVs) outlined the recent improvements and remaining deficiencies of the systems in operational use. The second session on assimilation and impact of AMVs in NWP focused on recent evaluation studies using operational numerical forecasts. The utilisation of AMVs was the focus of the third session. The fourth session featured three papers on space borne wind retrieval systems outside of AMVs derived from the geostationary satellite systems. Session five covered verification and objective quality analysis of AMVs. The AMVs discussed were those determined using geostationary satellite imager data; exclusively visible and infrared data at about 10.8 and 6.7 microns. The sixth and last session presented several papers on new developments and applications. Opportunities for using both polar and geostationary satellites to measure the earth-atmosphere were stressed; these include stereographic height assignments and polar microwave measurement of tropical cyclone intensity.

Three working groups were convened to address topics raised by the CGMS. They were 1) the Working Group on Methods, 2) the Working Group on Utilisation, and 3) the Working Group on Verification and Quality Indicators.

The detailed reports of the six sessions by the chairs and reports from the three working groups are provided separately on the following pages.

The workshop concluded with a plenary discussion, where IWW4 also assessed their accomplishments in the context of CGMS priorities and reviewed the scope of their future meetings.

Since 1991, the IWWG has a) made height assignments more uniform with IR-WV intercept approach, b) increased successful use of water vapour and visible winds, c) standardised reporting of AMV versus radiosonde observation differences, d) introduced common quality indicators for AMVs, e) initiated BUFR dissemination of AMVs with additional quality information, f) demonstrated positive impact of high density winds in some case studies (notably in tropical cyclone trajectory forecasts), g) studied global FGGE (First GARP Global Experiment) like wind data sets (for the first time since 1979), and h) demonstrated improvement in AMV derivation with more frequent observations (implications for revised

satellite operation schedules are being explored).

The specific accomplishments of IWW4 were felt to be: a) expansion of the winds user community resulting from enhanced Education and Training efforts as well as improved data communications; b) inauguration of high density winds and identification of some problems with data volume; c) characterisation of the strengths of automatic quality flags (QI (EUMETSAT Quality Indicator) and AE (Auto-Editor) used at NOAA/NESDIS); d) demonstration of applications in nowcasting as well as forecasting; e) initial study of additional benefit from direct assimilation of radiances in time sequences in NWP models; f) expansion of NWP impact studies to a more diverse community; g) realisation of FGGE like data sets with Meteosat-5 over the Indian Ocean; and h) initiation of dialogue with the scatterometer, passive microwave, and Doppler wind lidar community.

Concerning the future scope of the International Winds Workshop, there was general agreement that operational applications should continue to be the guiding theme for future workshops.

Having served as scientific convenor for two Winds Workshops Johannes Schmetz stepped back as scientific convenor of IWW. It was noted that the organisation of IWWs would not be possible without the dedicated work of local hosts. IWW4 thanked Dr. Donald Hinsman of WMO, the host of IWW4, for the excellent local organisation. The next workshop will be organised by Chris Velden and Ken Holmlund acting as scientific co-convenors. This workshop is planned for the year 2000.