

WORLD METEOROLOGICAL ORGANIZATION

CBS/ET-SBRSO-2 & CIMO/ET-ORS-
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**JOINT MEETING OF
CBS EXPERT TEAM ON SURFACE-BASED REMOTELY-
SENSED OBSERVATIONS**

(14.XI.2011)

(Second Session)

AND

ITEM : 2.2

**CIMO EXPERT TEAM ON OPERATIONAL REMOTE-
SENSING**

(First Session)

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REPORTS OF CHAIRS

Report of the Chair ET-ORS

(Submitted by Li Bai on Behalf of CIMO Expert Team
on Operational Remote-Sensing)

SUMMARY AND PURPOSE OF DOCUMENT

The paper discusses the review of remote-sensing in last session
and work plan of ET-ORS in this session

1. Review of the activities of operational remote-sensing for the last session

1.1 With a view to developing a comprehensive web-based weather radar database, the survey on weather radars has been conducted by Mr Oguzhan Sireci among WMO Members in August 2009, which focused on establishing some standards on some issues like data exchange and calibration in order to make manufacturers to achieve some goals and new improvements.

1.2 The projects both on the radar quality control and on quantitative precipitation estimation(QPE) intercomparison have been conducted. Specifically J-L Champeaux considers that the adjustment of QPE is well implemented in real-time with hourly rain gauges data, especially in case of heavy rain. Furthermore, Mr. Paul Joe supposes that radar networks, as a consistent framework, for describing the quality of the final QPE products is needed in terms of the differences in radars.

1.3 ET-RSUAT&T(Expert Team on Remote Sensing Up-Air Technology and Techniques) has developed the siting guidance on weather radar and wind turbine. Specifically, the distance between wind turbine and weather radar has been applied to generally describe the impact on radar quality data, as well as providing a mitigation strategy for cooperative siting of weather radar and wind turbine.

As to new facts, some primary progresses have been developed for wind turbine effect on weather radar. In view of JMA's analysis(*Yoshihisa Kimata*), two measures applied to eliminate the interference of Wind Turbine Clutter (WTC): "Compositing PPIs at several elevation angles (Quasi-CAPPI)" to avoid WTC, "Clutter Map" to remove WTC.

1.4 In terms of evaluating the current operation of lightning detection system, the survey has been conducted in order to report the strengths and weaknesses of existing system, e.g., coverage, accuracy, reliability and cost effectiveness.

2. ET-ORS

2.1 The Expert Team on Operational Remote-Sensing (ET-ORS) has been established by the WMO Commission for Instruments and Methods of Observation (CIMO), focusing on weather radar, wind profiler and lightning detection system.

2.2 The experts of ET-ORS on weather radar, wind profiler and lightning detection system are from 8 different countries, chaired by Mr LI Bai and Mr Richard ICE (Annex for list of experts).

All experts will actively promote each aspect of operational remote-sensing.

3. Work plan of ET-ORS in this session

3.1 Data exchange of weather radar

3.1.1 To ensure consistent level of data processing before exchange on GTS, level I/level II data of weather radar for data exchange over the GTS should be clearly defined.

3.1.2 Turkish Meteorological Service (TMS) has led the survey on weather radars. Furthermore, TMS intends to continue to develop and host web-based weather radar database on behalf of WMO. Therefore, the ET-ORS should work closely with TMS in the design and implementation of weather radar database.

3.2 Investigation on data quality control method of weather radar

3.2.1 The methods and procedures for the weather radar algorithm intercomparison should be defined, e.g., radar decoding software, metadata and measurement uncertainty.

3.2.2 The intercomparison and analysis should be followed in terms of the above definition.

3.2.3 Recommendation: the result of the analysis should be published as an IOM (Instruments and Observing Method) report, together with update of CIMO Guide Chapter on weather radar.

3.3 Investigation on the best practices for ensuring uniform performance of weather radars

3.3.1 With respect to high quality mosaic product for weather radar, some essential issues (e.g., wavelength, range, altitude, maintenance) should be taken into consideration. Specifically automatic calibration of weather radar will be considered as top priority in this session.

3.3.2 A document on standardization and requirements for calibration and maintenance of weather radars should be finished in this intersession, moreover, a number of maintenance and calibration methods, procedures and recommendations for weather radars will be included in this document.

3.4 Investigation on polarization technology on weather radar

3.4.1 In this session, the realizable benefits of polarization technology on weather radar should be evaluated by ET-ORS.

3.4.2 A report on benefits of polarization technology should be finished in this session.

3.5 Improvement of the weather radar performance in mountain regions

3.5.1 In some countries (e.g., China) some weather radars are located on high altitude, especially in mountain region. Considering this case, the corresponding strategies should be designed, e.g., low or negative angle of elevation scanning modes, or refining observation elevation at middle and low level range.

3.5.2 A report on the technology of improving low level performance and enhancing vertical resolution of weather radar should be finished in this session.

3.6 Guidance on the operation of wind profilers

3.6.1 Some operational aspects should be investigated, e.g., WPR type selection, configuration of radar site, deployment principles of site network, site location requirement, in particular different type of radar for different area.

3.6.2 To some extent, wind profilers will be affected by wind turbines and other moving objects, in a manner similar to weather radar. So in collaboration with CBS ET-SBORS, the investigation of the impact of wind turbine on wind profiler, based, for example, on the procedures applied by the Japan Meteorological Agency, should be highly encouraged.

3.6.3 The quality problems encountered in wind profiler data application on numerical weather prediction should be investigated. Meanwhile, the new quality control methods (removal of bird and insect echo, ground clutter and electromagnetic interference etc.) should be discussed. Moreover, corresponding document for wind profiler should be drafted, i.e., quality problems and operational signal and data processing scheme. The application of wind profiler data done by JMA should be considered, for example, establishing data quality control center.

3.6.4 Recommendation: in this session, ET-ORS should liaise and strengthen cooperation with CBS on implementation of wind profiler networks, also bring in THORPEX.

3.7 Designing evaluation method for the performances of lightning detection system

3.7.1 The survey on lightning detection systems has been conducted. Based on this work, feasible evaluation method for the performances of lightning detection system should be designed; also relevant documents should be drafted.

3.8 Investigation on the relationship among different precipitation observation systems

3.8.1 The comparison of precipitation observation from weather radar with satellites and rain gauges observations should be conducted in order to improve the accuracy of Quantitative Precipitation Estimation (QPE).

3.8.2 A report on the relevant result should be finished in this session.

3.9 Identify the tools and techniques to evaluate the accuracy of weather radars, wind profilers and lightning detection systems

3.9.1 Issues related to consistence and traceability to SI standards should be identified.

3.9.2 A report on the issues identified should be finished in this session.

3.10 Contribute to the implementation of WIGOS and provide relevant advice and support to the CIMO-MG

3.10.1 Some activities should be addressed in align with relevant items of WIGOS Implementation Strategy approved by Cg-XVI and subsequent WIGOS IP.

Annex

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