CGMS

CGMS-34, NOAA-WP-12
Prepared by M. Goldberg
Agenda Item: II/4
Discussed in WG2

REPORT FROM THE INTERNATIONAL TOVS WORKING GROUP

NOAA-WP-12 provides a report from the International TOVS Working Group.

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1. INTRODUCTION

The fifteenth International TOVS Study Conference, ITSC-XV, was held close to the town of Maratea in southern Italy from 4 – 10 October 2006. Around one hundred and ten participants attended the Conference and provided scientific contributions. Sixteen countries, and three international organizations were represented: Australia, Brazil, Canada, China, France, Germany, Hungary, India, Italy, Japan, Norway, Poland, Russia, Sweden, United Kingdom, United States, ECMWF, EUMETSAT and WMO. The last three meetings have had a similar number of attendees. The working groups had very useful discussions and it was encouraging to see a large number of new younger scientists participating. Originally it was hoped that the conference attendees would be able to learn about the launch of Europe's first polar orbiting meteorological satellite, METOP-A, but unfortunately it was delayed until after the conference.

Most of the meeting was occupied with oral presentations and two poster sessions on a range of issues which included the following:

- Radiative transfer and surface modeling
- Climate applications
- ATOVS cloud studies
- Direct broadcast software, education and frequency protection (dedicated to Guy Rochard)
- Pre-processing and calibration
- Operational use of ATOVS
- Developments in use of ATOVS in NWP
- International Issues and Agency Status Reports
- Products from ATOVS
- METOP Developments
- Future sensors

There were 77 oral and 50 poster presentations during the conference; the agenda is given in Appendix A. All of the talks and many of the posters can be viewed on our web site at http://cimss.ssec.wisc.edu/itwg .

Working Groups were formed to consider six key areas of interest to the International TOVS Working Group (ITWG), including Radiative Transfer and Surface Property Modelling; Use of ATOVS in Numerical Weather Prediction; Use of TOVS and ATOVS for Climate Studies; Advanced Sounders; International Issues; and Satellite

Sounder Science and Products. The Working Groups reviewed recent progress in these areas, made recommendations on key areas of concern and identified items for action. Working Group reviews and recommendations comprise an important part of the ITSC-15 Working Group Report, available around 1 December 2006. A summary of the key points arising from the conference are listed below.

During the Conference, a session on working group status reports considered activities that had taken place since ITSC-XIV in Beijing. This session also reviewed progress on the Action Items and Recommendations identified by the ITSC-XIV Working Groups. Many of these items formed the basis for further discussion by the Working Groups at ITSC-XV. Several technical sub-groups also met during ITSC-XV to discuss developments and plans concerning specific software packages, shared and in common use.

The conference also paid tribute to Guy Rochard, a recent ITWG co-chair who had attended nearly every conference, who died suddenly in November 2005. A special session was dedicated to direct broadcast software, education and frequency protection, the main areas in which Guy was actively involved in his career. In addition during the conference banquet several members of the group recalled Guy's life and his major contributions to the atmospheric sounding community. He will be sadly missed by the ITWG.

1.1 SUMMARY OF MAJOR CONCLUSIONS

The ITSC-XV presentations, posters, working group meetings and discussions documented significant issues in many areas and noted areas for future activity. In particular, it noted that:

1. The results of new observing system experiments presented at ITSC-XV demonstrate that satellite data have a large impact on weather forecast accuracy and promising new results suggest the potential for future enhancements in the use of satellite sounder and imager data. It is crucial that future instruments as a baseline maintain, and if cost effective improve upon, the quality of AMSU and AIRS.

2. Many NWP centres are now assimilating radiances from the advanced infrared sounder, AIRS, and getting significant positive forecast impacts. The use of the warmest field of view, in the AMSU-A footprint, recommended at the last conference has replaced the centre field of view used initially.

3. The AIRS radiances assimilated are still a small fraction of those available but some efforts are underway to allow a more complete use of the AIRS data (e.g. through use of reconstructed radiances).

4. Many NWP centres are ready to assimilate IASI radiances once they become available with the help of NESDIS who have provided a simulated IASI dataset. A channel sub-set of about 300 IASI radiances has been identified for distribution to NWP centres on the GTS.

5. The number of NWP centres using level 1b ATOVS radiances in their variational assimilation systems continues to grow but there are still centres that rely on the level 2 retrievals provided by NESDIS.

6. The Regional ATOVS Retransmission Service, RARS, has been significantly developed since ITSC-XIV. The EUMETSAT EARS service has continued to expand and more NWP centres are using the EARS data. The Asia-Pacific RARS has started operations and NWP centres are already beginning to assimilate ATOVS data from this new data stream. RARS networks in S. America and Africa are being planned. The group encouraged WMO and the space agencies to continue to develop this ATOVS retransmission service as a low cost means of providing more timely ATOVS data over most of the globe.

7. The group also noted the good progress by NOAA to reduce the delay in the NOAA blind orbits for the global dataset by using the Svalbard ground station. This should become operational in early 2007.

8. An important issue for consideration is that when MODIS is retired, according to current plans, there will not be an imager in polar orbit with a channel in the water vapor band. This will degrade the accuracy of any polar cloud track winds. Space agencies are urged to consider the best means for providing a polar orbiting imager with water vapor channels along with the conventional VIS and IR channels.

9. It was noted that the SSM/I sensor on DMSP-F15 was no longer being used by users due to the beacon interference with the 23GHz channel. A process to clean up the data was presented at the conference which should be made available to the users to allow them to assess if they can start to use data from this satellite again.

10. Considerable progress in the pre-processing of SSMIS data has been made with at least one NWP centre now able to use the sounding channels operationally. Further improvements to the pre-processing were identified during the conference. The group encouraged the SSMIS cal/val team to make the data available from DMSP-F17 as early as possible after the launch to expedite their use in operational systems.

11. A third high spectral resolution sounder workshop was held at Madison, Wisconsin, USA in April 2006 to allow a more detailed discussion of scientific issues related to advanced sounders with many eminent scientists attending. These workshops also educate and train young scientists entering the field.

12. An ITWG workshop on remote sensing and modeling of surface properties was held in Paris, France in June 2006 allowing a focused discussion on this aspect of radiative transfer in order to facilitate more use of the sounder data over land. It is planned to hold another workshop in early 2008.

13. The community software packages for processing locally received ATOVS data have been upgraded to allow data to be processed from METOP, including IASI. The updates will shortly be available for free distribution to users. This kind of ATOVS processing software has been essential in the use of ATOVS data by the meteorological community.

14. A freely available software package for processing locally received MODIS and AIRS data is being used by many countries for imagery and for Level 2 products. This IMAPP software also adds applications from AMSR-E. Future development of DB packages for METOP-IASI, NPP AND NPOESS are also planned.

15. The group urged space agencies to provide documentation on data formats well before launch to allow similar community software packages to be developed for planned new satellites (e.g. FY-3 and NPP).

16. The group noted the increasing threat of RF interference in microwave imager channels as demonstrated by AMSR-E and all members were urged to lobby their respective radio communication authorities to support protection of the imager and sounder bands.

17. A presentation on the need to foster training on remote sensing measurement systems and products to young scientists was given and the group agreed to enhance its efforts in education and training through a dedicated section of the web site. A workshop to co-ordinate satellite meteorology training was also proposed along with the possibility of certification of some courses. Satellite provider agencies were encouraged to continue and expand their support for education and training of the next generation of remote sensing scientists.

18. It was recommended that as the NOAA-18 HIRS is not providing good data the HIRS on METOP should be used with the new 10km field of view to allow comparisons with the 17km field of view on NOAA-17 HIRS in terms of yield of cloud free radiances. This field of view difference should be studied to consider the requirement for the field of view size for future sounders.

19. The group was pleased to note that the Integrated Program Office (IPO) has decided to put NPP into a PM ascending orbit as recommended by the ITWG at ITSC-XIV to provide continuity with Aqua/AIRS. This will help to ensure at least long term atmospheric sounder coverage in 2 orbits.

20. The time series of (A)TOVS now exceeds 27 years and the quality and number of climate products continues to grow. One sign of the importance of climate studies to society, is that there are now efforts emerging to support the routine, operational production of TOVS Climate Data Records at several centers.

21. The group supported the continuing efforts to develop the GCOS Atmospheric Reference Observation Network (GARON) for climate with the primary objective of creating long term records of critical upper air measurements and associated error characteristics to support their continuing integration in climate applications and research.

22. The ITWG recommended that satellite agencies support the new WMO Global Space based Inter-calibration System (GSICS) to improve the accuracy of global satellite observations for weather, climate and environmental applications through an operational inter-calibration of the space component of the World Weather Watch (WWW)'s GOS and GEOSS.

23. The recent NOAA-14 pitch maneuver to investigate the calibration of the radiometers was welcomed as a useful end of life activity and may provide new information on the calibration of the sensors.

24. The group recommended studies to quantify the benefits of dual polarisation channels on conical scanning microwave radiometers for sounding channels which have significant surface contributions to assess if enhanced discrimination of surface effects is possible.

25. It was recognised that high spectral resolution imaging radiometers on geostationary platforms are likely to be an important part of the future global observing system. It was recommended that a demonstration mission be conducted in the near future. GIFTS is the best current option for such a mission.

26. The group was concerned that critical climate monitoring instruments have been removed from NPOESS, specifically the loss of CrIS/ATMS in the 0530 orbit plane, removal of the limb instrument for ozone monitoring, and the Earth Radiation Budget sensors. Removal of CrIS/ATMS in the 0530 orbit seriously affects the monitoring of the diurnal cycle. The removal of ERBS breaks the climate series of a 30 year continuous climate sensor time series. Several options to mitigate this loss were proposed.

2. FUTURE PLANS

Immediately following the ITSC-XV meeting the process for the election of the new ITWG co-chairs began and they should be duly elected by December 2006. This will ensure that following the success of the ITSC-XV meeting in October 2006 the ITWG will continue to meet and inform the ATOVS community of the latest news and developments through its web site currently maintained by the University of Wisconsin CIMSS and the email list server maintained by WMO.

In particular, more information suitable for education and training will be incorporated onto the web site. A second workshop on radiative transfer modelling of the surface is planned to take place during 2008. Plans are being formulated for the next International Direct Broadcast Conference (date, time TBA). EUMETSAT and CNES are hosting a workshop on the use of IASI data in autumn 2007 which will build on the ITWG sponsored advanced sounder workshops. The links with international bodies such as the IRC, WMO and CGMS will be maintained and a report of this meeting will be made to forthcoming IRC and CGMS meetings.

The oral and poster presentations from ITSC-XV are already available as PDF files which can be downloaded from the ITWG web site. The next meeting of the ITWG is planned for spring 2008. Topics of interest will include extensive evaluation of METOP data, initial assessment of FY-3 data and status of preparations for the NPP launch.