

**REPORT FROM
THE INTERNATIONAL TOVS WORKING GROUP**

A report from the ITOVS Working Group for
the International Radiation Commission.

REPORT FROM THE INTERNATIONAL TOVS WORKING GROUP

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1. INTRODUCTION

The fourteenth International TOVS Study Conference, ITSC-XIV, was held on the Chinese Meteorological Administration campus in Beijing, China from 25 – 31 May 2005. Around one hundred and twenty participants attended the Conference and provided scientific contributions. Twenty one countries, and three international organizations were represented: Australia, Austria, Brazil, Canada, China, Denmark, France, Germany, Hungary, India, Italy, Japan, South Korea, New Zealand, Norway, Poland, Portugal, Sweden, Taiwan, the United Kingdom, the United States of America, ECMWF, EUMETSAT and WMO. This was the largest conference to date in terms of total number of presentations and posters. The conference attendees were able to witness images from the successful deployment of the new ATOVS instruments on NOAA-18, which had been launched the previous week.

Most of the meeting was occupied with presentations on a range of issues which included:

- ATOVS radiance and retrieval studies
- ATOVS cloud studies
- Climate applications
- Radiative transfer and surface modeling
- Operational use of ATOVS
- Use of ATOVS in NWP
- Direct reception and software packages
- Preparations for METOP and NPOESS
- Future instruments

There were 77 oral and 80 poster presentations during the conference. An effort was made to reduce the number of oral presentations for this conference compared with ITSC-XIII in order to create a less crowded program (which can be found in Appendix A).

Working Groups were formed to consider six key areas for the International TOVS Working Group (ITWG), including Radiative Transfer and Surface Property Modeling; Use of TOVS and ATOVS in Numerical Weather Prediction; Use of TOVS and ATOVS for Climate Studies; Advanced Sounders; International Issues and Future Systems; 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. Key Working Group recommendations are summarized below. The Working Group reports in full will be published in the ITSC-XIV Report which is in preparation and will be available from the ITWG web site <http://cimss.ssec.wisc.edu/itwg/>.

During the Conference, a session on Status Reports considered summaries of activities that had taken place since ITSC-XIII. This session also reviewed progress on the Action Items identified by the ITSC-XIII Working Groups. Many of these items formed the basis for further discussion by the Working Groups at ITSC-XIV. Several technical sub-groups met during ITSC-XIV to discuss developments and plans concerning specific software packages, shared and in common use in TOVS, ATOVS and Advanced Sounder processing centres. Brief reports on these sub-group meetings are recorded in the ITSC-XIV report. Holding the conference in Beijing also allowed the conference participants to learn more about the latest developments in the Chinese meteorological satellite program which is now well advanced after the successful operation of its new generation geostationary satellite, FY-2C.

2. SUMMARY OF MAJOR CONCLUSIONS

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

1. Two operational NWP centres are now assimilating radiances from the advanced infrared sounder, AIRS, on the EOS Aqua satellite and getting significant positive forecast impacts even though the radiances assimilated are a small fraction of those available. Work is underway to allow a more complete use of the AIRS data (e.g. more channels especially in the shortwave infrared, more data over land, and possibly cloud cleared radiances).
2. A new AIRS dataset containing the warmest field of view in the AMSU-A footprint instead of the central field of view is about to be made available operationally to NWP centres. Tests at ECMWF suggest this dataset allows more AIRS data to enter the analysis. NOAA are about to provide to NWP centres a dataset which uses MODIS to identify the clearest AIRS fields of view.
3. In addition to AIRS several centres are also assimilating the Aqua AMSU-A radiances to increase the robustness of their systems to possible loss of data from the NOAA constellation.
4. The number of NWP centres using level 1b ATOVS radiances in their variational assimilation systems continues to grow but there are still some centres that rely on the level 2 retrievals provided by NESDIS.
5. Several NWP centres have started using ATOVS radiances from the EUMETSAT Advanced Retransmission Service, EARS, in order to provide more timely data (within 30 minutes) to their NWP models. This was originally envisaged to be for regional models but global models are also benefiting from the improved timeliness of these data.
6. With the success of EARS the group encouraged further initiatives, now being setup to expand the coverage beyond Europe and N. America (e.g. RARS), to be implemented.

7. The group also supported plans by the satellite agencies to reduce the delay in the blind orbits for the global dataset by using ground stations closer to the poles.
8. The assimilation of higher resolution ATOVS data in local area models was presented, (e.g. Met Office, HIRLAM) expanding the exploitation of ATOVS data for NWP.
9. The first data from the Microwave Humidity Sounder (MHS) on NOAA-18 was shown during the conference. Although very similar to AMSU-B there are a few minor differences in the instrument characteristics. NWP centres are planning to assimilate NOAA-18 ATOVS data within a few months of its availability.
10. All satellite agencies should be urged to provide their data to NWP centres as part of the cal/val program. Recent experience with SSMI(S) data has once again shown the value of NWP to help diagnose unforeseen instrument characteristics. It is also important to allocate resources for dedicated cal/val campaigns for new sensors using aircraft to measure both in-situ parameters and co-incident radiance measurements.
11. Preparations for METOP launch in 2006 are well underway. The offer of NESDIS to provide simulated IASI data to NWP centres will help ensure they are prepared for IASI data soon after METOP launch. Only a subset of IASI channels will be available to NWP centres on the GTS and so activities are underway to define the optimal channel subset for NWP applications.
12. Since the last ITSC a second high spectral resolution sounder workshop was held at Ravello, Italy in May 2004 to allow a more detailed discussion of scientific issues related to advanced sounders. These workshops can educate and train young scientists entering the field. Another workshop is planned before the next ITSC.
13. The community software packages for processing locally received ATOVS data have been upgraded to allow data to be processed from NOAA-18. 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. The issue of maintaining consistency between globally processed ATOVS and locally processed ATOVS was discussed and recommendations were made to ensure this is the case for METOP and equivalent NPP/NPOESS sensors.
15. Community software for processing Terra and Aqua locally received data (i.e. AIRS, AMSU-A, HSB, AMSR-E and MODIS) is available for direct broadcast users. The conference discussed plans to provide similar software for the NPP and NPOESS data.
16. The group noted the development of the Community Radiative Transfer Model at the Joint Centre for Satellite Data Assimilation and encouraged all radiative transfer (RT) modelers to standardize on the interfaces to their models to make it easier for users to

incorporate the RT models into their own applications and to facilitate comparisons.

17. Results from an intercomparison of radiative transfer calculations for AIRS co-ordinated by the group were presented. This study will help to quantify the forward model errors for advanced sounders.
18. It was recommended to set up an ITWG surface property modeling sub group to better co-ordinate developments in infrared and microwave surface modeling. It will report to the RT and surface modeling group but hold its own meetings.
19. Several radiative transfer models for rain affected microwave radiances have been developed and preliminary experiments demonstrating the assimilation of rain affected radiances have begun. This offers a new source of information from satellite data not yet exploited in NWP.
20. As with previous conferences the group reiterated the importance of using more data over land. There were no major advances reported in the use of infrared radiances over land however promising results were presented for the use of more microwave radiances over land.
21. The group was updated about plans for a reference network of radiosonde stations, with additional surface based measurements to ensure the accuracy of the in situ sounding. This reference network has been proposed to the GCOS group in WMO and is planned to be implemented in the next 5 years. The group supported this proposal for climate monitoring applications.
22. The ITWG hosted the satellite frequency co-ordination group meeting, SFCG-24, in September 2004 in Lannion, France. R. Saunders (ITWG Co-chair) gave a presentation to the meeting on the issues of frequency protection for NWP applications. It was noted the RF interference is now evident in all the AMSR-E low frequency bands in spite of some of them being protected.
23. The working group noted that WMO and CGMS have developed the Virtual Laboratory for Training in Satellite Meteorology (VL). The ITWG Members were asked to review and provide guidance for the VL material related to ATOVS. The ITWG will establish an outreach and education focal point to serve as liaison between ITWG and the VL focus group.
24. Access to documents describing NPOESS/NPP ground processing and raw data and sensor data records (content and format) still needs to be established to allow review by members of the group. IPO representatives undertook to ensure early release of these documents.
25. The new 10km field of view on the NOAA-18 HIRS will allow comparisons with the 17km field of view on NOAA-16 HIRS in terms of yield of cloud free radiances. The effect of this field of view difference should be studied to consider the requirement

for the CrIS field of view size.

26. The ITWG noted there are differences between the AMSU and ATMS sounder specifications and recommended studies are undertaken before ITSC-XV to determine the impact of these differences for users. This will also inform specifications for future microwave sounders.
27. The ITWG recommended the Integrated Program Office (IPO) to consider placing NPP into a 1430 UTC ascending orbit (instead of the planned 1030 UTC descending orbit in order to complement the METOP/IASI with NPP/CrIS and to provide continuity with Aqua/AIRS).
28. The ITWG noted and endorsed studies underway that demonstrate the feasibility of a microwave imager/sounder in geostationary orbit.

3. FUTURE PLANS

Following the success of the ITSC-XIV meeting in May 2005 the ITWG will continue to inform the ATOVS community of the latest news and developments through its web site maintained by the University of Wisconsin and the email list server maintained by WMO. In particular, more information suitable for training will be incorporated on to the web site. A workshop on high spectral resolution sounders is planned to take place during 2005/6. There will be an International Direct Broadcast Conference in Benevento, Italy in October 2005. The EUMETSAT NWP Satellite Application Facility is hosting a workshop on radiance bias correction at ECMWF in November 2005. The AIRS radiative transfer model intercomparison sponsored by ITWG will be published. The links with international bodies such as the IRC, WMO and CGMS will be maintained.

In addition to this ITSC-XIV Working Group Report, a Proceedings for ITSC-XIV from the papers submitted will be provided to attendees and other interested persons on CD-ROM. The oral and poster presentations from ITSC-XIV are already available as pdf files which can be downloaded from the ITWG web site. The next meeting of the ITWG is planned for Autumn/Winter 2006. Topics of interest will include detailed evaluation of NOAA-18 ATOVS data, initial assessments of METOP data and status of preparations for NPP launch.

Appendix A



The 14th International TOVS Study Conference (ITSC-14) Beijing, China

PROGRAM

Wednesday 25 May 2005

9:00-9:30 Welcome

Co-Chairs Tom Ahtor, Roger Saunders
Dr. Yu Rucong, Deputy Administrator of
CMA

Local Arrangements

Dongfeng Luo

Review Agenda/Key Issues

9:30-10:30

Session 1: ATOVS Radiance Studies

Chair: Dong Chaohua

1.1	William L. Smith	Ultra High Spectral Resolution Satellite Remote Sounding - Results from Aircraft and Satellite Measurements
1.2	Lydie Lavanant	A global cloud detection scheme for high spectral resolution instrument
1.3	Bormin Huang	Cloud Classification of Satellite Radiance Data by the Local Region of Influence Method
1.4	Allen Larar	Satellite Infrared Radiance Validation Studies using a Multi-Sensor/Model Data Fusion Approach

10:30-11:00 BREAK

11:00-11:30

Session 1: ATOVS Radiance Studies

(continued)

1.5	Chian-Yi Liu (for Jun Li)	An optimal cloud-clearing method for AIRS radiances using MODIS
1.6	Allen Huang	Characterization of Infrared Imager/Sounder and Infrared/Microwave Sounder Synergistic Cloud-Cleared Infrared Radiances

11:30-12:15

Session 2: ATOVS Retrieval Studies

Chair: Bill Smith

2.1	Devendra Singh	A neural network based algorithm for the retrieval of TPW from AMSU measurements
2.2	Fuzhong Weng	Microwave Integrated System for Retrieving Atmospheric Temperature, Water Vapor and Cloud Water Profiles
2.3	Zhigang Yao	Preliminary Results of Atmospheric Temperature Retrievals with Least Squares Support Vector Regression

12:15-13:45 Lunch (Plus Poster Session Preparation)

13:45-14:45

Session 2: ATOVS Retrieval Studies

Chair: Peter Schlüssel

2.4	Tony Reale (for A.K. Sharma)	NOAA/NESDIS updates for sounding data products and services
2.5	Peter Wang	The analysis of typhoon parameters by using AMSU data
2.6	B. J. Sohn	Estimating stability indices from MODIS infrared measurements over the Korean Peninsula
2.7	Bjorn Lambrigtsen (for Sung-Yung Lee)	Version 4 AIRS Data Products

14:45-15:15 BREAK

15:15-16:15

Session 2: ATOVS Retrieval Studies

Chair: Allen Huang

2.8	Clémence Pierangelo	Retrieving the effective radius of Saharan dust coarse mode with AIRS observations
2.9	Eva Borbas	Combining GPS occultations with AIRS infrared measurements for improved atmospheric sounding
2.10	Deming Jiang	Neural Networks for Atmospheric Temperature Retrieval from AQUA AIRS/AMSU/HSB Measurements on Different Types of Terrain
2.11	Dan Zhou	Initial retrieval inter-comparisons from the European AQUA Thermodynamic Experiment

16:15-18:00

Poster Session A

18:00 Icebreaker (sponsored by Kongsberg Spacetec)

Thursday 26 May 2005

8:30-9:30

Session 3: ATOVS Cloud Studies**Chair: Rolando Rizzi**

3.1	Paul Menzel	Using 22 Years of HIRS Observations to infer Global Cloud Cover Trends
3.2	Claudia Stubenrauch	Survey of cirrus and atmospheric properties from TOVS Path-B: Natural variability and impact of air traffic on cirrus coverage
3.3	Filomena Romano	Cloud Parameters from Infrared and Microwave Satellite Measurements
3.4	Hong Zhang	Sensitivity study of the MODIS cloud top property algorithm to CO2 spectral response functions

9:30-10:00**Session 4: Climate Applications****Chair: Mitch Goldberg**

4.1	John Bates	Analysis of Systematic Errors in Climate Products
4.2	Peter Thorne	Climate monitoring of the free atmosphere: past mistakes and future plans

10:00-10:30 BREAK

10:30-11:15**Session 4: Climate Applications****(continued)**

4.3	Tony Reale	Satellite Coincident Reference Upper Air Network and Potential Impacts for Climate and NWP
4.4	Yinghui Liu	Spatial and Temporal Characteristics of Satellite-Derived Clear-sky Atmospheric Temperature Inversions in the Arctic, 1980-1996
4.5	Lei Shi	Using HIRS observations to construct long-term global temperature and water vapor profile time series

11:15-12:00**Session 5: NPOESS Preparation****Chair: Mitch Goldberg**

5.1	Hal Bloom	Overview and Status of the NPOESS System: Providing Improved Real-Time Data To Meet Future Needs
5.2	Peter Wilczynski	The National Polar-orbiting Operational Environmental Satellite System (NPOESS) and NPOESS Preparatory Project (NPP) Access to Data
5.3	General Discussion on Future Direct Readout	

12:00-13:30 Lunch (Plus poster session preparation)

13:30-15:00 Poster Session B

15:00-16:45 ITSC-13 Action Items presented by ITSC-13 WG Chairs/Moderators: Tom Achtor/

Roger Saunders

- Radiative Transfer and Surface Property Modeling (Roger Saunders)
- ATOVS/TOVS in Climate Studies (John Bates)
- ATOVS/TOVS in NWP (Steve English)
- Advanced Infrared Sounders (Allen Huang)
- International Issues and Future Systems (Guy Rochard)
- Satellite Sounder Science and Products (Tony Reale)

16:45-17:00 Working Group Formation

Chairs: Roger Saunders and Tom Achtor

Friday 27 May 2005

8:30-10:30

Session 6: Radiative Transfer and Surface Models

Chair: Louis Garand

6.1	Jean-Luc Moncet	The OSS method: current research and new prospects
5.2	Ralf Bennartz	The successive order of interaction (SOI) radiative transfer model and its possible applications to radiance assimilation of clouds and precipitation
6.3	Xu Liu	Validations of a Principal Component-based Radiative Transfer Model Using AIRS and NAST-I Observed Radiances
6.4	Paul Poli	Using microwave and infrared radiances from off-nadir pixels: application of radiative transfer to slanted line-of-sight and comparisons with NASA EOS Aqua data
6.5	Nicole Jacquinet-Husson	Assessing spectroscopic parameter archives for the second generation vertical sounders radiance simulation; illustration through the GEISA/IASI database
6.6	Tom Kleespies	Comparison of Simulated Radiances, Jacobians and Information Content for the Microwave Humidity Sounder and the Advanced Microwave Sounding Unit-B
6.7	Fatima Karbou	On the estimation and use of land surface microwave emissivities
6.8	Fuzhong Weng (for Yong Han)	Development of the JCSDA Community Radiative Transfer Model (CRTM)

10:30-11:00 BREAK

11:00-12:15

Session 7: Operational Applications

Chair: John LeMarshall

7.1	Graeme Kelly	Use of satellite radiances in the 4D-VAR ECMWF system
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7.2	Brett Harris	Use of Level-1D ATOVS Radiances in GASP
7.3	Fiona Hilton	Current Use of Satellite Data in the Met Office Global NWP Model
7.4	Thibaut Montmerle	Respective contributions of polar orbiting and geostationary radiances within Météo-France's operational 3D-Var assimilation system at regional scale
7.5	Florence Rabier	Use of radiances in the operational assimilation system at Météo-France

12:15-13:45 Lunch

13:45-15:15

Session 8: Use of ATOVS in NWP

Chair: John Eyre

8.1	Andrew Collard	Improved use of AIRS data at ECMWF+IASI channel selection
8.2	Louis Garand	AIRS assimilation at MSC
8.3	John Le Marshall	AIRS Associated Accomplishments At The JCSDA
8.4	Chris Tingwell	Assimilation of Level-1D ATOVS Radiances in the Australian Region LAPS System
8.5	John George	Impact of ATOVS data in a mesoscale assimilation-forecast system over Indian region
8.6	Peiming Dong	The Use of ATOVS Microwave Data in the Grapes-3Dvar System

15:15-15:45 BREAK

15:45-17:00

Session 8: Use of ATOVS in NWP

(continued)

8.7	David Anselmo	The assimilation of ATOVS and SSM/I brightness temperatures in clear skies at MSC
8.8	Roger Randriamampianina	On the use of bias correction method and full grid AMSU-B data in a limited area model
8.9	Brett Candy	Improved use of AMSU-B data in UK Met Office regional models
8.10	Lei Zhang	Assimilation of total precipitable precipitation in a 4D-Var system: A case study
8.11	Thomas Auligne	Progress of bias correction for satellite data at ECMWF

Peking Duck Dinner (sponsored by Raytheon, VCS)

Saturday 28 May 2005

Working Groups

9am-12pm (or as arranged by chairmen)

Sunday 29 May 2005

Working Groups

6pm-8pm (or as arranged by chairmen)

Monday 30 May 2005

8:30-10:30

Session 9: International Status Reports

Chair: Paul Menzel

9.1	Jim Purdom	The Redesign and Evolution of the Global Observing System
9.2	Dong Chaohua (for Wenjian Zhang)	China's current and future meteorological satellite systems
9.3	Xu Jianmin	Products from FY2C Geostationary Meteorological Satellite
9.4	Devendra Singh	Report on Indian Meteorological Satellite Program
9.5	Tom Achtor (for Alexander Uspensky)	Report on Russian Meteorological Satellite Program
9.6	Dieter Klaes	EUMETSAT Plans
9.7	John Eyre	The NWP SAF: what can it do for you?
9.8	Mitch Goldberg	NESDIS Plans for AIRS, CrIS and IASI: Program and Science
9.9	John Bates	Overview of the CLASS and Scientific Data Stewardship programs within NOAA

10:30-11:00 BREAK

11:00-11:45

Session 9: International Status Reports

(continued)

9.9	Guy Rochard	Frequency Management
9.10	George Ohring	Assimilation of Satellite Cloud and Precipitation Observations in NWP Models: Report of a Workshop
9.11	Jim Purdom	The Virtual Laboratory for Satellite Training and Data Utilization: Maximizing the Use of Satellite Data across the Globe

11:45-12:30

Session 10: Direct Reception/Software Packages

Chair: Guy Rochard

10.1	Einar Grønås	MEOS POLAR - A cost effective Direct Broadcast terminal for current and future L and X-band polar orbiting satellites
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10.2	Nigel Atkinson	AAPP status report and review of developments for NOAA-N and METOP
10.3	Philippe Marguinaud	The IASI L1 processing software and its integration within AAPP

12:30-14:00 Lunch

14:00-15:30

Session 11: Preparations for METOP

Chair: Dieter Klaes

11.1	Denis Blumstein	IASI on METOP: On ground calibration of the FM2 instrument
11.2	Peter Schlüssel	Super Channel Selection for IASI Retrievals
11.3	Thomas King	Development of the IASI operational processing and distribution system
11.4	Simon Elliott	Dissemination of global products from MetOp
11.5	Marc Schwaerz	A Joint Temperature, Humidity, Ozone, and SST Retrieval Processing System for IASI Sensor Data: Properties and Retrieval Performance Analysis
11.6	Eamonn McKernan	Calibration and Validation of Metop/ATOVS and AVHRR products

15:30-16:00 BREAK

16:00-16:45

Session 12: Future Instruments

Chair: Jim Purdom

12.1	Paul Menzel (for Jeff Puschell)	NPOESS VIIRS: Design, Performance Estimates and Applications
12.2	Vince Tabor	Initial Joint Polar-orbiting Satellite System (IJPS) Era Processing and Beyond at the Information Processing Division (IPD) of the National Environmental Satellite, Data and Information Service (NESDIS)
12.3	Bjorn Lambrigtsen	Microwave Sounder for GOES-R – A GeoSTAR Progress Report

16:45-19:00 BREAK (Working Group Meetings to finish reports)

19:00 Banquet(sponsored by NSMC)

Tuesday 31 May 2005

9:00-10:00 Technical and Working Group Reports and actions summary

- AAPP, IAPP, 3I, ERA-40
- Radiative Transfer and Surface Property Modeling (Louis Garand)
- ATOVS/TOVS in Climate Studies(John Bates)

- ATOVS/TOVS in NWP (Steve English)

10:00-10:30 BREAK

10:30-11:30 Working Group Reports and actions summary (continued)

- Advanced Infrared Sounders (Bill Smith)
- International Issues and Future Systems (Paul Menzel)
- Satellite Sounder Science and Products (Tony Reale)

11:30-11:45 Future meetings relevant to ITWG

11:45-12:00 Plans for next meeting and closing remarks
Co-Chairs Tom Achtor, Roger Saunders

Poster Session A: Wednesday

- A01 Fuzhong Weng:** Intersatellite calibration of HIRS from 1980 to 2003 using the simultaneous nadir overpass method for improved consistency and quality of climate data
- A02 Zhaohui Cheng:** Study of MSU Channel-3 Brightness Temperature Time Series Using SNO calibration method
- A03 Clémence Pierangelo:** 8-year climatology of dust aerosol in the infrared with HIRS
- A04 Clémence Pierangelo:** Impact of tropical biomass burning emissions on the diurnal cycle of mid to upper tropospheric CO₂ retrieved from NOAA-10 satellite observations
- A05 Claudia Stubenrauch:** Evaluation of parametrizations of microphysical and optical properties for radiative fluxes computations in climate models using TOVS-ScaRaB satellite observations
- A06 Chunxiang Shi:** Study on Cloud Classifications by using AVHRR, GMS-5 and Terra/MODIS satellite data
- A07 Donald Chu:** Resolving Tropical Storm Inner Core Temperatures with a Three-Meter Geostationary Microwave Sounder
- A08 cancelled**
- A09 Jeff Puschell:** Wind Imaging Spectrometer and Humidity-sounder (WISH)
- A10-A16 Withdrawn**
- A17 Bjarne Amstrup:** First experiences with RTTOV8 for assimilating AMSU-A data in the DMI 3DVAR data assimilation system
- A18 Steve English:** Implications for modelling ocean surface emissivity for AMSU, ATMS and CMIS from the Windsat mission
- A19 Steve English (for Bill Bell):** The assimilation of SSMIS radiances at the Met Office
- A20 Ralf Bennartz:** The Second International Precipitation Working Group (IPWG-2004) Workshop
- A21 Jakob Grove-Rasmussen:** Implementation of AMSU-A usage over sea-ice regions in DMI-HIRLAM

- A22 **Sang-Won Joo:** Recent Development of ATOVS usage in Korea Meteorological Administration
- A23 **Fatima Karbou:** On the assimilation of AMSU-A & -B raw radiances over land at Météo-France
- A24 **Kozo Okamoto:** Assimilation of SSM/I radiances in the NCEP global data assimilation system
- A25 **Yoshihiro Yamasaki:** TOVS and the MM5 analysis over Portugal
- A26 **Vibeke Thyness:** Assimilating AMSU-A over sea ice
- A27 **Per Dahlgren:** Data Assimilation of ATOVS at SMHI, Sweden
- A28 **Izabela Dyras:** The retrieval of the atmospheric humidity parameters from NOAA/AMSU data for winter season
- A29 **Songyan Gu:** Soil Moisture Retrieval Test over The West of China by Use of AMSU Microwave Data
- A30 **Zhe Liu:** Analysis of typhoon rananim using products retrieved from ATOVS
- A31 **Zhiquan Liu:** Robust Variational Inversion : A Study with ATOVS data
- A32 **Mitch Goldberg** (for S. Kondragunta): Total Ozone Analysis from SBUV/2 and TOVS (TOAST)
- A33 **Mitch Goldberg** (for Cheng-Zhi Zou): MSU channel 2 brightness temperature trend when calibrated using simultaneous nadir overpasses
- A35 **Peter Wang:** Assessment of Precipitation Characters between Ocean and Coast area during Winter Monsoon in Taiwan
- A36 **Thwong-Zong Yang:** Rain Rate Estimation in Summer of Taiwan
- A37 **Tom Kleespiess** (for Yong Han): Optran Version 7
- A38 **Tom Kleespiess** (for Paul van Delst): The Community Radiative Transfer Model (CRTM) Framework
- A39 **Fiona Hilton:** Establishing a Microwave Land Surface Emissivity Scheme in the Met Office 1D-Var
- A40 **Chengli Qi:** Atmospheric transmittance calculation of Infrared atmospheric sounder of FY-3A meteorological satellite
- A41 **Dieter Klaes:** First results from NOAA-N with the ATOVS and AVHRR Product Processing Facility for EPS
- A42 **Fengying Zhang:** Overview of ATOVS data processing and applications at NSMC of China

Poster Session B: Thursday

- B01 **Domenico Cimini:** Analysis of radiosonde quality characteristics by ground- and satellite-based simultaneous observations during the WVIOP2004 experiment
- B02 **Tony Reale:** Satellite Coincident Reference Upper Air Network and Potential Impacts on Real-time and Retrospective Satellite Products
- B03 **Tony Reale:** NOAA Operational Sounding Products for Advanced -TOVS: 2004/5
- B04 **Jörg Schulz:** The Humidity Composite Product of EUMETSAT's Climate Monitoring SAF: Towards Optimal Merging of Satellite Data Sets
- B05 **Vanessa Sherlock:** Preliminary results from the Lauder site of the Total Carbon

- Column Observing Network (TCCON)
- B06 Vanessa Sherlock:** A simulation study of the impact of AIRS fast model errors on the accuracy of 1D-Var retrievals from AIRS radiances
 - B07 Steve Ackerman:** Cloud Detection: Optical Depth Thresholds and FOV Considerations
 - B08 Jian Liu:** An Automated, Dynamic Threshold Cloud Detection Algorithm
 - B09 Rolando Rizzi:** Preliminary results combining ground based-Raman lidar and airborne spectrometers to describe the evolution of a cirrus cloud (Italian Equate campaign)
 - B10 Chaohua Dong:** Experimental study on water vapor amount calculation using 940 NM absorption spectral band data
 - B11 Yang Hu:** FY3 MicroWave Imaging Radiometer (MWIR) surface parameters inversion algorithm and validation in China
 - B12 Chian-Yi Liu:** Applications of the GOES-R HES (Hyperspectral Environmental Suite) Infrared measurements
 - B13 Chian-Yi Liu:** Improvement on sounding retrievals from GOES Sounder measurements
 - B14 Chian-Yi Liu:** Synergistic Use of the ABI and HES for Atmospheric Sounding and Cloud Property Retrieval
 - B15 Thomas Kleespies:** NOAA-KLM HIRS Level 1b Data Issues
 - B16 Thomas Kleespies:** Plotting Realistic Instantaneous Field of View Ellipsoids on an Arbitrary Earth Projection
 - B17 Bjorn Lambrigsten:** Microwave Sounder Scan Bias Analysis From AIRS/AMSU Observations
 - B18 Guy Rochard:** Frequency Management
 - B19 Licheng Zhao:** Introduction to China Meteorological Satellite Operational System
 - B20 Denis Blumstein:** IASI on METOP: In-flight calibration plan
 - B21 Andrew Collard:** Selection of a subset of IASI Channels for Near Real Time Dissemination
 - B22 Andrew Collard (for Marco Matricardi):** The introduction of clouds and aerosols in RTIASI
 - B23 Niels Bormann:** Assimilation of infrared limb radiances from MIPAS in the ECMWF model
 - B24 Niels Bormann:** RTMIPAS: A fast radiative transfer model for the assimilation of infrared limb radiances from MIPAS
 - B25 James Cameron:** Operational use of AIRS Observations at the Met Office
 - B26 James Cameron:** Estimation of the Representivity Error for AIRS
 - B27 Withdrawn**
 - B28 Louis Garand:** Assimilation of cloudy radiances from hyperspectral infrared radiances
 - B29 Reinhold Hess:** Status of Assimilating Satellite Data at DWD
 - B30 Matthew Szyndel:** SEVIRI radiance assimilation at ECMWF
 - B31 Hua Zhang:** The assimilation of AIRS radiance over land at Météo-France
 - B32 Eva Borbas:** Global profile training database for satellite regression retrievals with estimates of skin temperature and global ecosystem-based emissivity

- B33** **Jing Huang:** Estimating the Retrievalability of Atmospheric Temperature from Satellite Infrared Simulation data
- B34** **Paolo Mazzetti:** Investigating AMSU and AMSR-E Rainfall Estimates using Active Microwave Sensors
- B35** **Rodrigo Souza:** ICI Atmospheric profiles over Rondonia using HSB data emulated from AIRS information
- B36** **Rodrigo Souza:** Performance of the AQUA/NASA and NOAA-16/ICI soundings over Rondonia during the dry-to-wet LBA Experiment
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- B49** **Einar Grønås:** MEOS POLAR - Direct Broadcast terminal for L and X-band polar orbiting satellites.