

# Status of RTTOV-7 and plans for RTTOV-8

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- **Reminder of RTTOV-7 features**
- **Usage of RTTOV-7 and problems**
- **How to get the code**
- **Upgrades planned for RTTOV-8**

*Acknowledgements*

*P. Brunel, A. Smith, F. Chevallier, S. English,  
M. Matricardi, P. Francis, P. Rayer*

# RTTOV changes since ITSC-12

- RTTOV-7 released by NWP-SAF in Mar 2002.
- Update to RTTOV-7 (RTTOV-71 released Jan 03).
- Instrument coefficient files released as required on web site.
  - NOAA-17 ATOVS & AVHRR
  - AQUA AMSU-A, HSB, AIRS & AMSR
  - ADEOS-2 AMSR
- RTTOV-8 planned for release in Feb 04.
- RTTOV-9 planned for early 2007.

# RTTOV-7 enhancements over RTTOV-6

- Improved water vapour and ozone optical depth predictors
- Multi-layer clouds, more realistic emissivities and random overlap assumption have been added for both IR and MW
- Update of microwave sea surface emissivity model FASTEM to FASTEM-2
- Inclusion of cosmic background radiation (mw only)
- Addition of AIRS, SSMI(S) and others (see next slide)
- Separate coefficient files for each sensor makes maintenance easier

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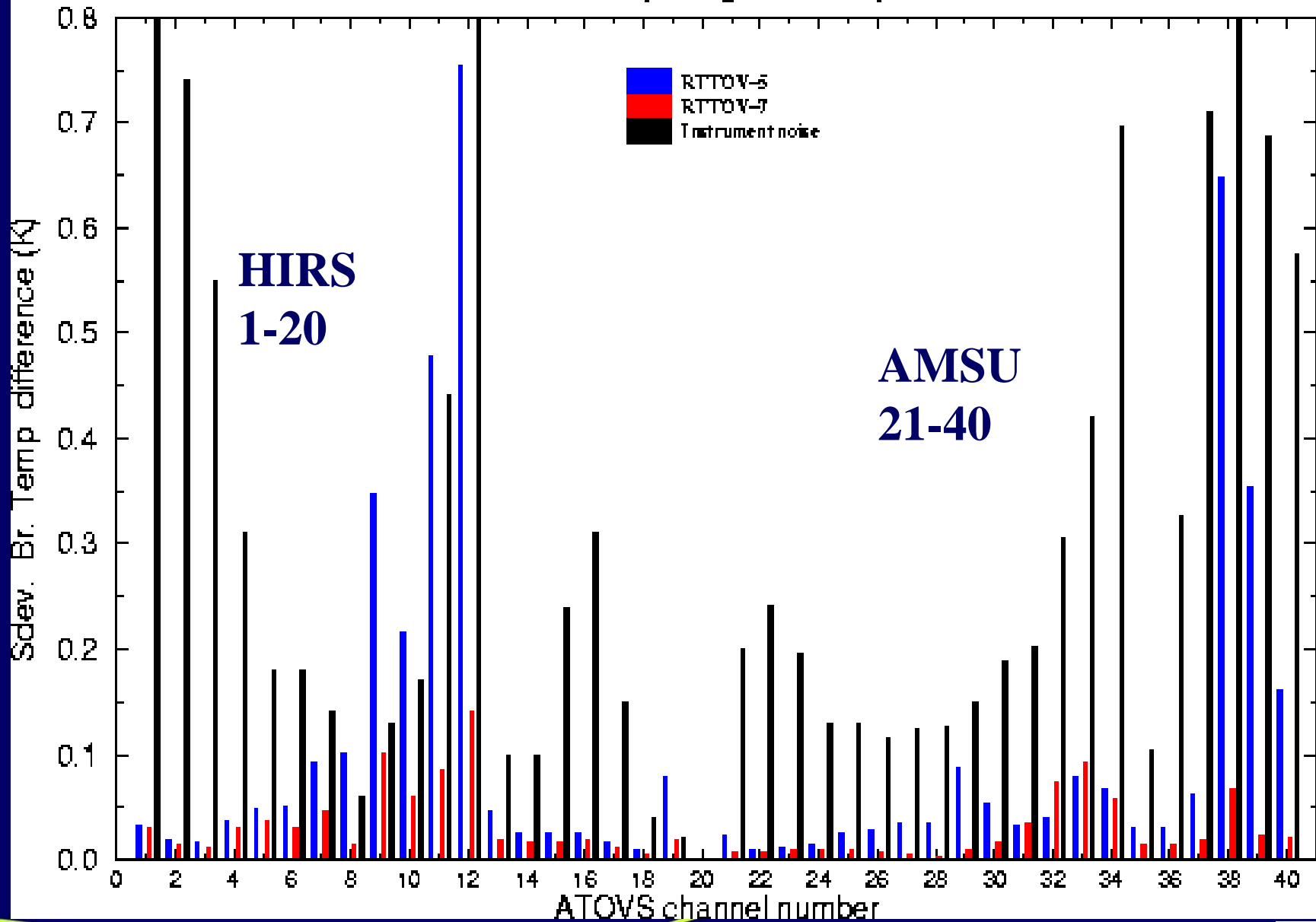
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# Satellite sensors supported by RTTOV-7

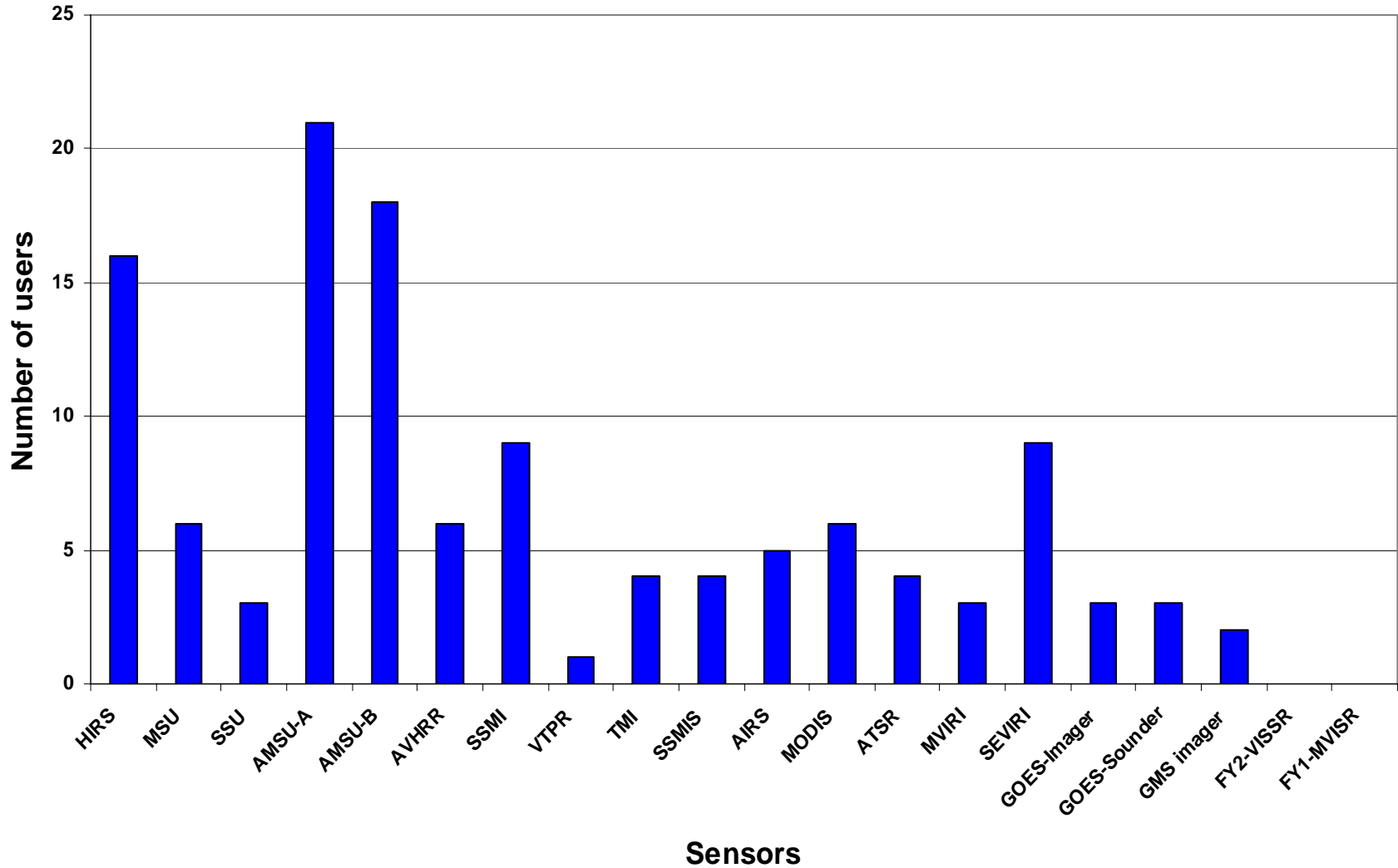
Sensor	RTTOV id	Channels
HIRS	0	1 to 20
MSU	1	1 to 4
SSU	2	1 to 3
AMSU-A	3	1 to 15
AMSU-B	4	1 to 5
AVHRR	5	1 to 3
SSMI	6	1 to 7
VTPR1	7	1 to 8
VTPR2	8	1 to 8
TMI	9	1 to 9
SSMIS	10	1 to 24
AIRS	11	1 to 2378
HSB	12	1 to 4
MODIS	13	1 to 17
ATSR	14	1 to 3
MHS	15	1 to 5
AMSR	17	1 to 14
MVIRI	20	1 to 2
SEVIRI	21	1 to 8
GOES-Imager	22	1 to 4
GOES-Sounder	23	1 to 18
GMS imager	24	1 to 2
FY2-VISSR	25	1 to 2
FY1-MVISR	26	1 to 3



# RTTOV User Survey

- **>54 users of the RTTOV-7 code worldwide**
- **Used for radiance assimilation in many NWP centres**
- **Feedback on which sensors are being modelled by users (see next slide)**
- **Feedback on what sensors not currently supported users would like to see supported:**
  - **AMSR - now available**
  - **MHS – need channel characteristics**
  - **MTSAT – need channel characteristics**
  - **Windsat – need channel characteristics**

# RTTOV-7 users



# RTTOV web site

<http://www.metoffice.com/research/interproj/nwpsaf/rtm/>

- Profile datasets

- [Documentation](#) (pdf)
- [Diverse 117 profile dataset from ECMWF 50L model fields](#) (0.2 Mb)
- [Diverse 52 profile dataset from ECMWF 60L model fields](#) (0.35 Mb) & [associated surface variables](#) (5 Kb)
- [ECMWF 60L profile datasets from model fields and documentation](#) (gzipped tar file, 14 Mb)



- RTTOV code updates, documentation, updated coefficient files and bug reports (click on model version you require)

- [RTTOV-5](#)
- [RTTOV-6](#)
- [RTTOV-7](#)

- To obtain a copy of the latest RTTOV-7 code send an e-mail to [rttov.nwpsaf@metoffice.com](mailto:rttov.nwpsaf@metoffice.com) requesting a copy. In addition the license agreement which can be [downloaded here](#) must be completed, signed and faxed to Roger Saunders at: +44-1392-885681. On receipt of the email and fax the code will be made available on CD or by FTP from ECMWF (contact [data.services@ecmwf.int](mailto:data.services@ecmwf.int)).

# RTTOV Distribution

- Requests: email [rttov.nwpsaf@metoffice.com](mailto:rttov.nwpsaf@metoffice.com) or
- fax request to +44-1392-885681 **New number!**
- I reply with a 2 page licence form to sign which you then fax to number above
- RTTOV-7 code is then distributed via ECMWF data services: [data.services@ecmwf.int](mailto:data.services@ecmwf.int) on requested format/medium
- Two formats:
  - » **Compressed unix tar file of F90 code+files**
  - » **CDROM of F90 code+files (separate or tar file)**
- Media: ftp transfer or CDROM
- Documentation + updates available from NWP-SAF web page
- <http://www.metoffice.com/research/interproj/nwpsaf/rtm>
- RTTOV-6 is also available (e.g. for F77 users)
- Please give feedback on any bugs by email to: [rttov.nwpsaf@metoffice.com](mailto:rttov.nwpsaf@metoffice.com)

# RTTOV-7 Documentation/Updates

<http://www.metoffice.com/research/interproj/nwpsaf/rtm/>

- **Email news list** if you have requested RTTOV
- **Users guide** (overview, installation, testing, interfaces)
- **Science and validation plan** (overview of new science and links to papers/reports giving more details, validation results documented here).
- **Technical report** (details of software architecture, file formats and interfaces)
- **SAF reports on RTTOV** (access from web page)
- **Bugs and fixes** (alerts on RTTOV email list, details on web page)

# Problems with RTTOV-7

- **New interfaces require code redesign in users code**
- **Spikes in wv jacobians in stratosphere**
- **Slower than RTTOV-5 on Met Office Cray T3E**
- **'Hardwired' to 43 pressure levels**
- **Conversion from RTTOV-5 to RTTOV-7 has been problematic at Met Office (note S. English's talk)**
- **Need to learn from users problems**



# Plans for RTTOV-8

- Rewrite code using full F90 features
- Allow easier use of different number of levels (~40 ATOVS, 80 AIRS)
- Include CO<sub>2</sub> as a variable gas (as an option)
- Optimise predictors (number, robustness) + inc water vapour continuum as separate gas
- Include precipitation in state vector for microwave channels
- Upgrade FASTEM for fully polarimetric simulations
- Add IASI/CriS simulation capability
- Improve IR cloudy radiance simulations
- *Update IR LbL dependent transmittances with latest spectroscopy and EC 60L diverse profiles*

# RTTOV related presentations

- **Operational use of ATOVS at Met Office – S. English (Oral)**
- **RTIASI-4 - Matricardi (Oral)**
- **Use of plank weighted transmittances - Brunel (Poster)**
- **Comparison of RTTOVSCAT and ARTS - English (Poster)**
- **AIRS fast model comparison - Saunders (Poster)**
- **RTTOV\_SCATT - Chevallier (Poster)**