



IASI L1 NRT data quality monitoring at EUMETSAT

**Lars Fiedler,
Yakov Livschitz, Denis Blumstein,
Eric Pequignot, Tim Hultberg and
Francois Montagner**

Outline



- 1. Introduction**
- 2. Summary on IASI L1 data quality**
- 3. Results from 12 months of radiance monitoring**
- 4. Conclusions**
- 5. Outlook: IASI L1C Day-2 product content**

Introduction

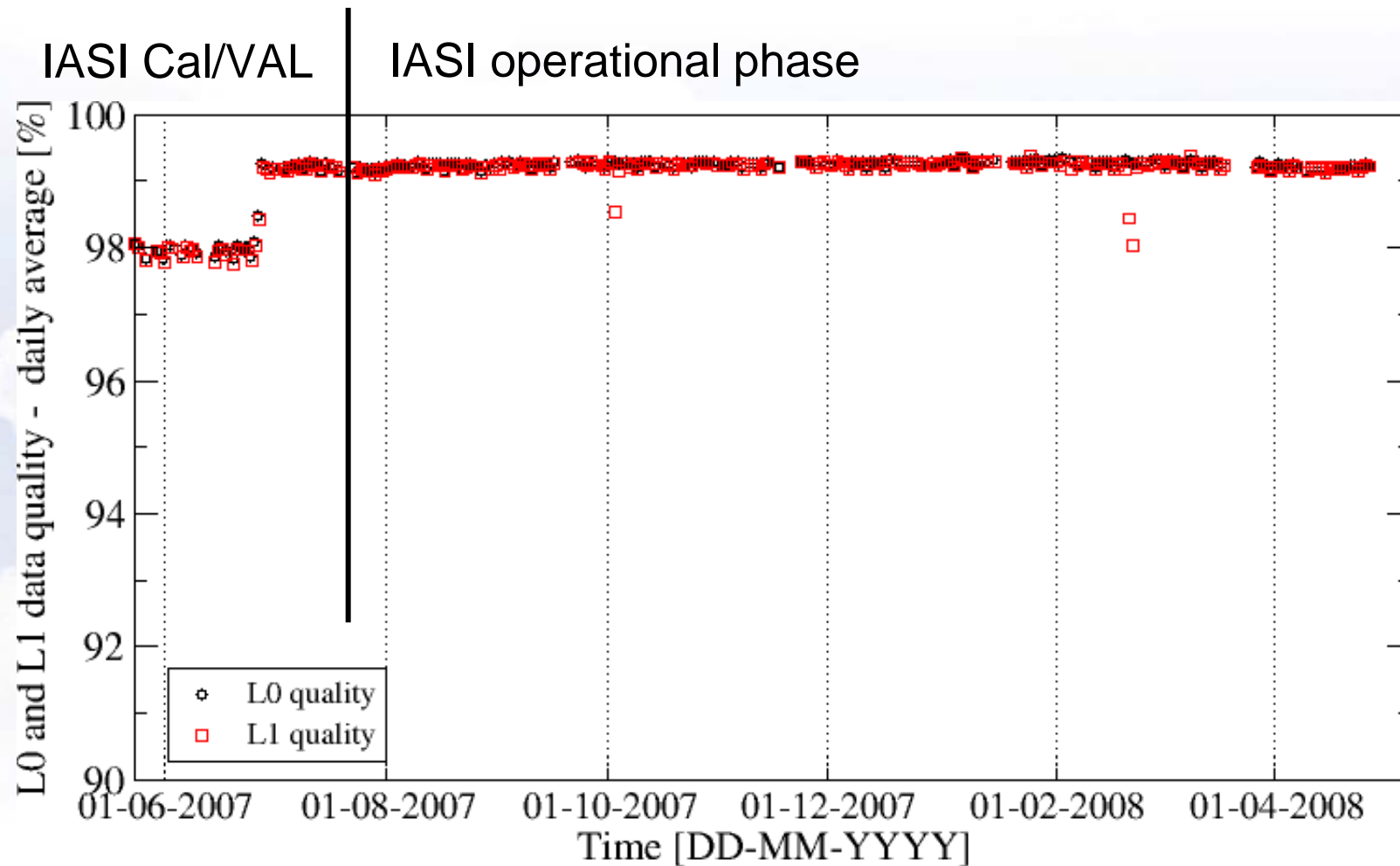


- **IASI NRT product quality monitoring was started in April 2007 at EUMETSAT headquarter.**
- **Near real time reports on data quality are used to support of decisions on product dissemination.**
- **NRT monitoring is using IASI quality and processing parameters and the**
- **Radiance monitoring which is based on forecast data and AVHRR L1B data.**
- **Daily and weekly reports are used to maintain data quality.**

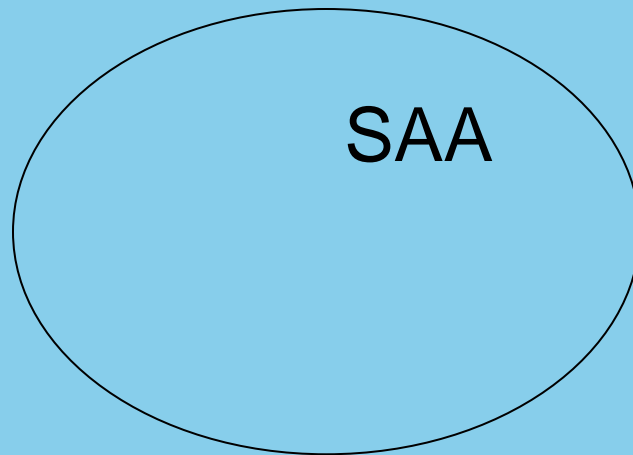


IASI L1 data quality - daily average

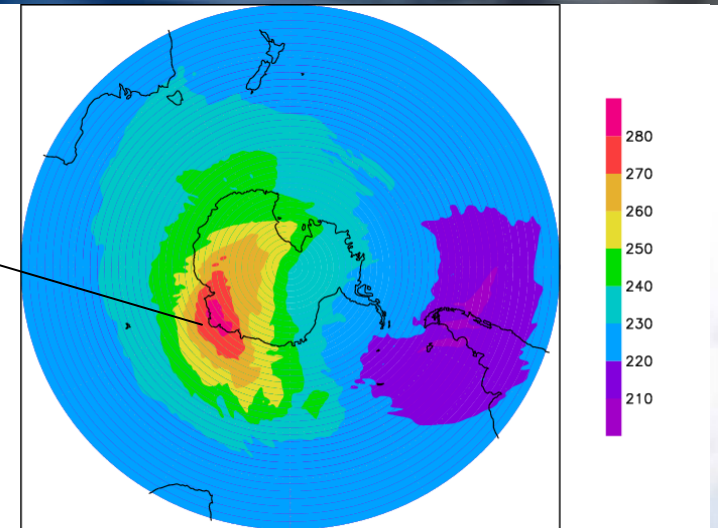
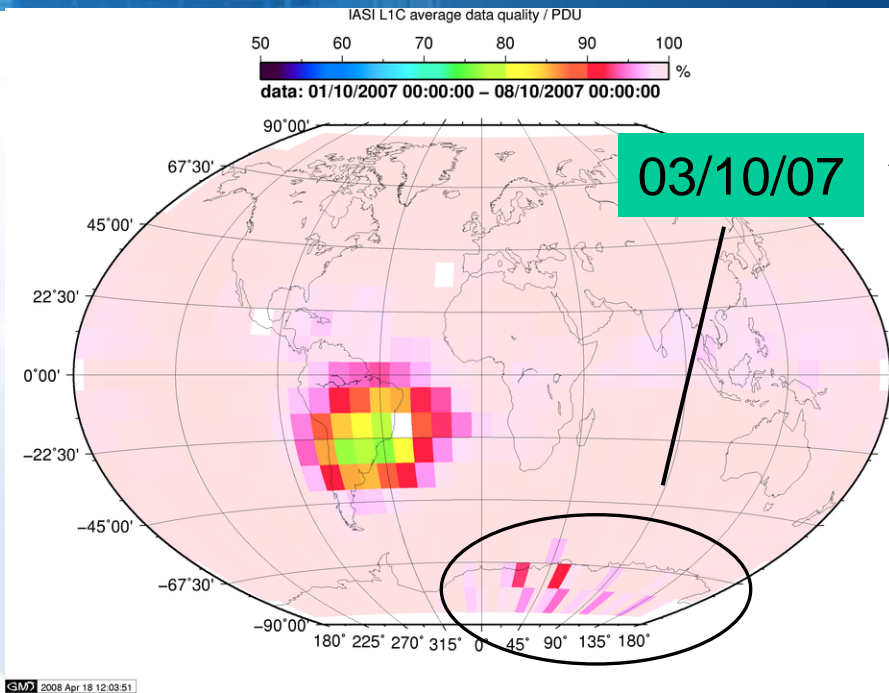
26/07/2007



IASI L1 data quality – weekly box averages of 3 min PDUs

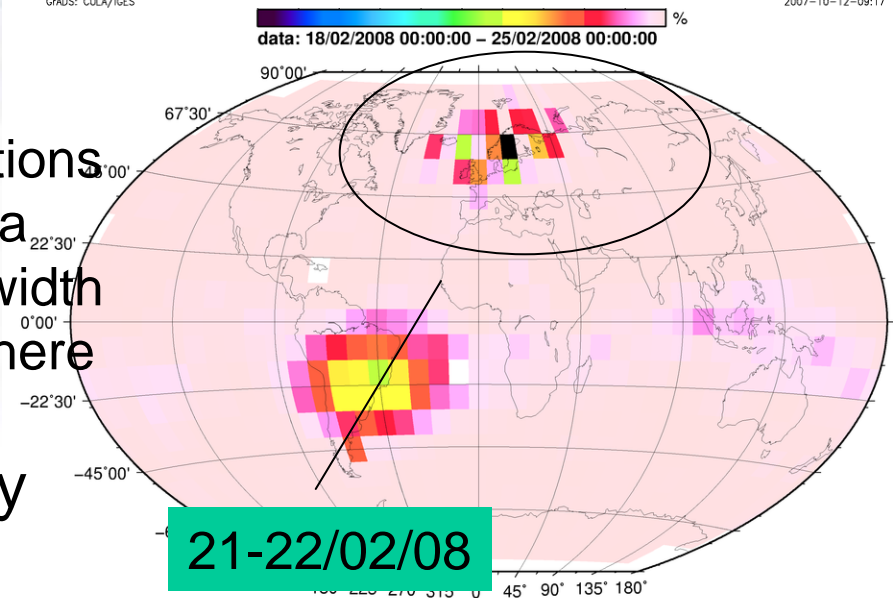


IASI L1 data quality – two occasions with very high temperatures in the stratosphere



GRADS: COLA/IGES

2007-10-12-09:17



- Slightly reduced availability at specific locations for few orbits due to overflows in the L0 data compression because of limitation of bandwidth
- Only at very high temperatures in stratosphere
- User notification was sent 22/02/2008
- Instrument and processing were fully nominal at all times

Radiance monitoring (RM) setup at EUMETSAT

ECMWF 6-hour forecast
91 lev (80km), 55km
T,WV,O3

SST and
cloud cover
from AVHRR L1B

IASI L1C
spectra
all channels

co-location:
nearest neighbour,
Forecast +/- 1h,
sea at night only

All AVHRR clear and
99% in one cluster

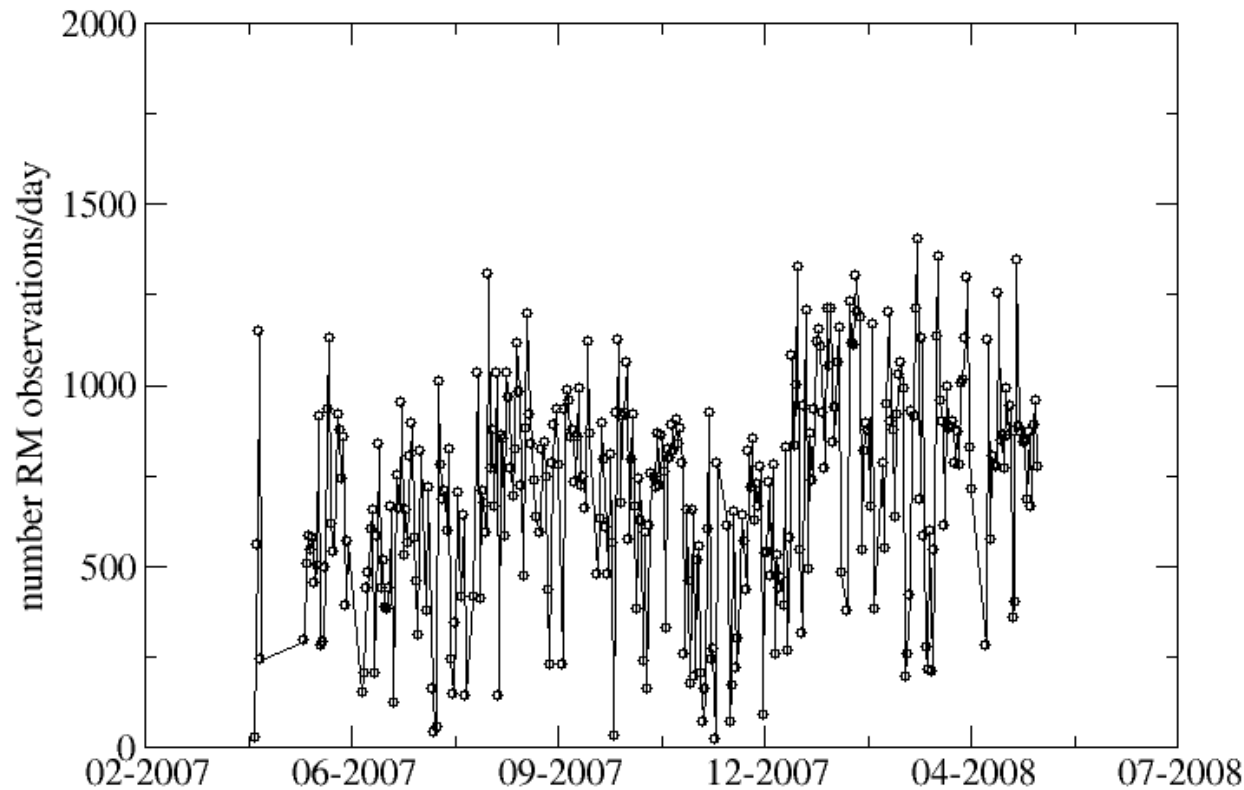
RTIASI 4
based on GENLN2
HITRAN2000

OBS – CALC
Radiance bias



RM: Number of Observations per day

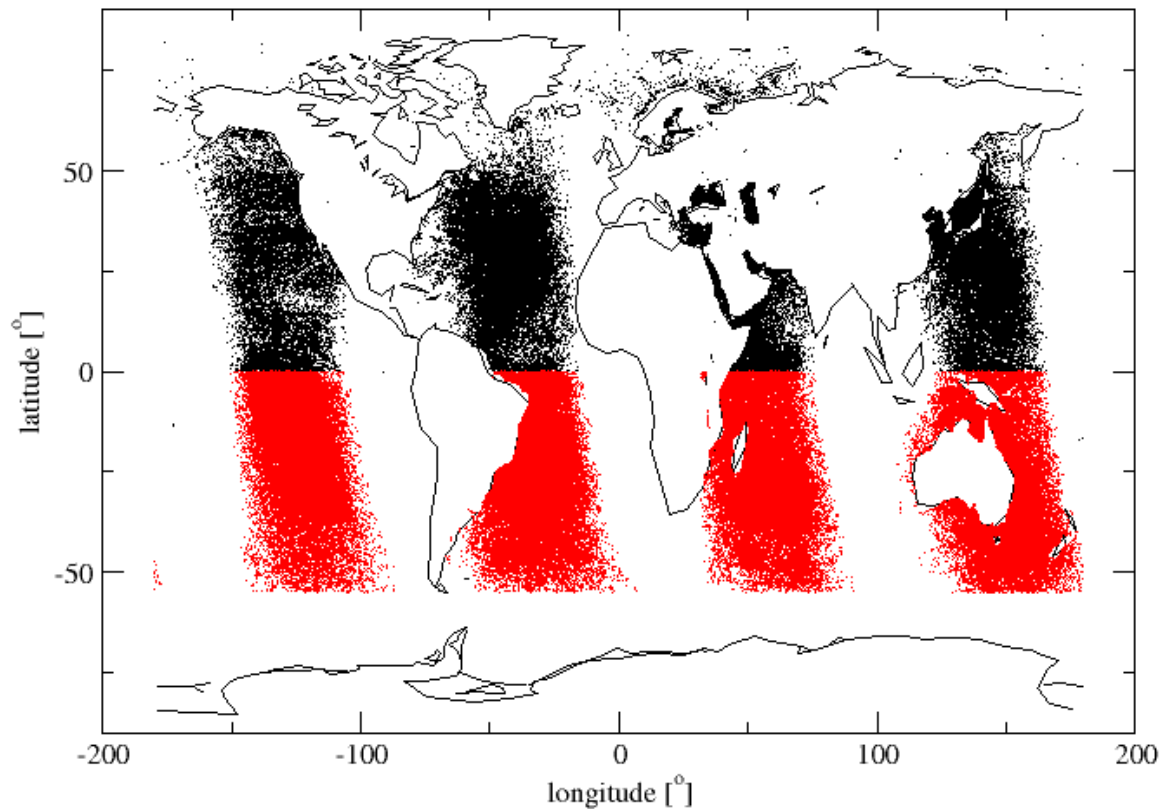
225000 cases between Mai 2007 and April 2008
average of 700 cases per day





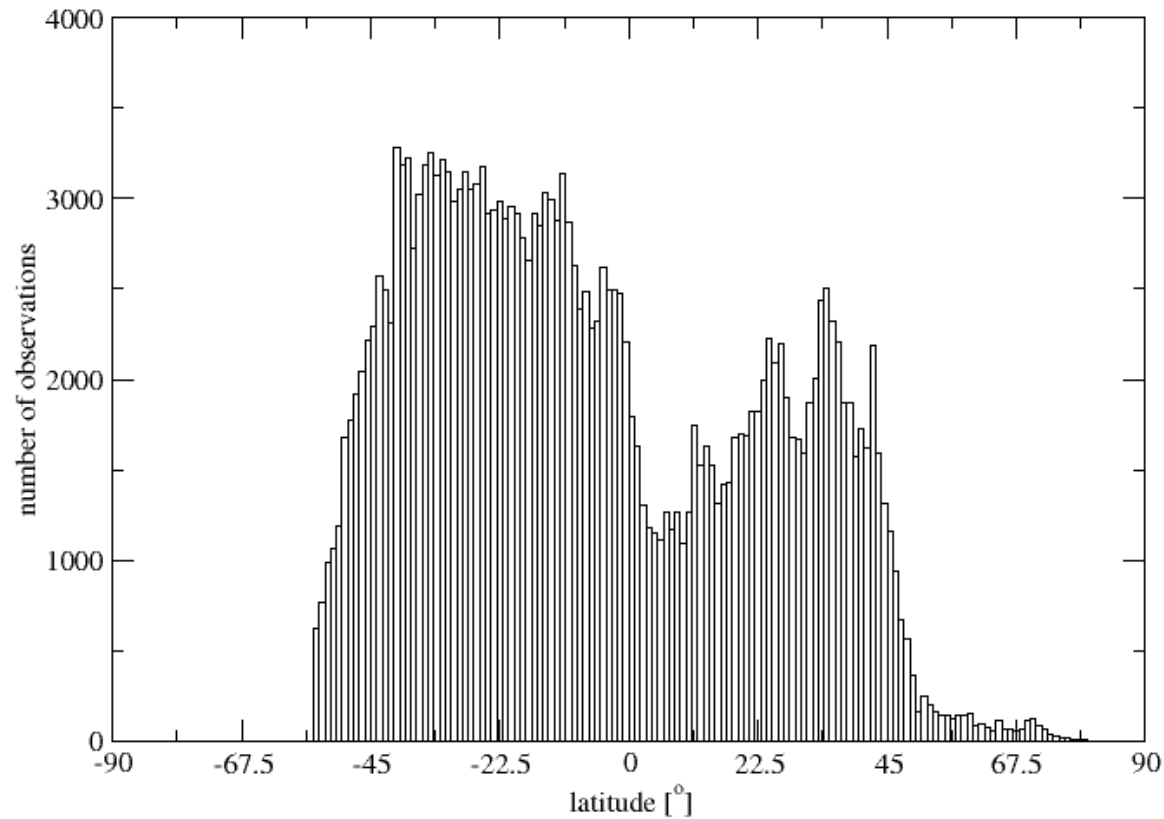
RM: Global distribution

Only clear sky situations at night are used for monitoring
Incomplete global coverage due to usage of 6h forecast data (+- 1h)





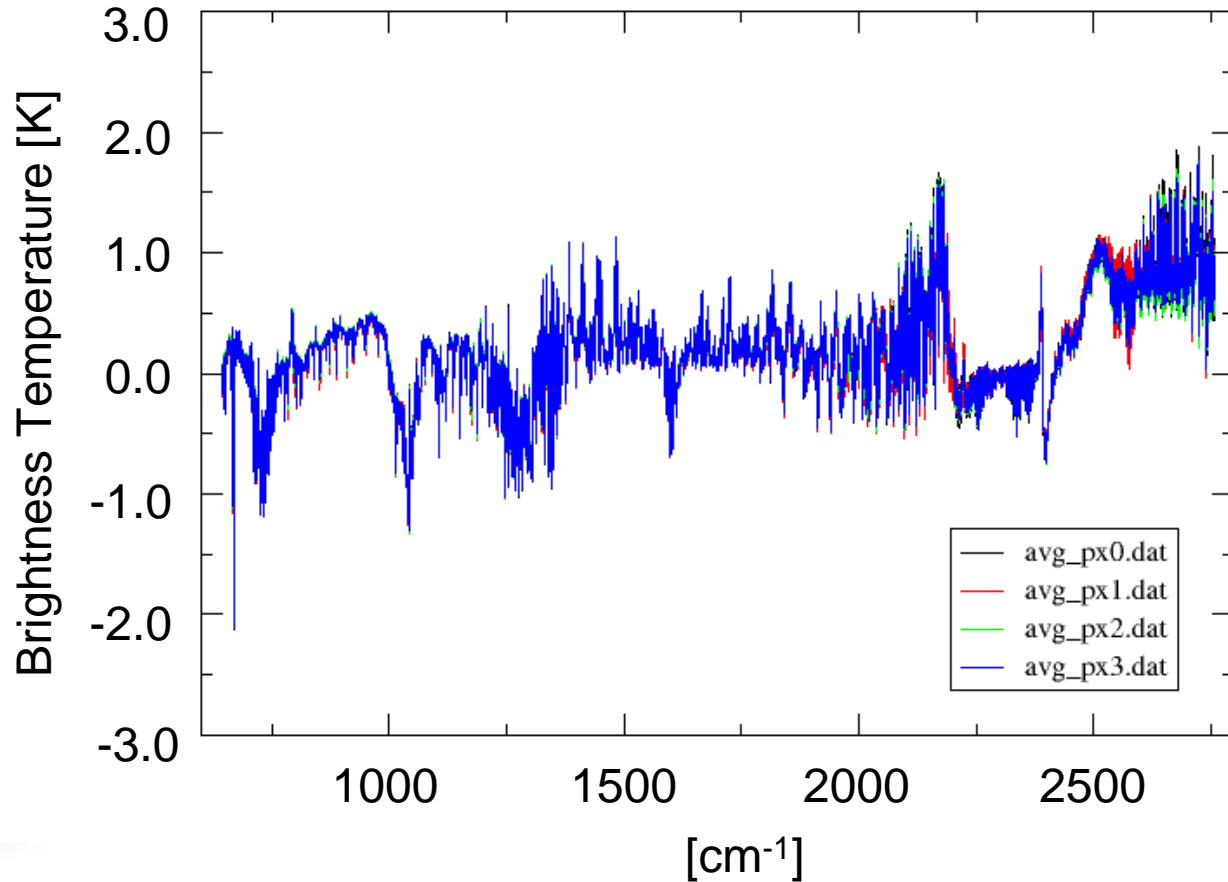
RM: Distribution over latitudes





RM: Radiance bias of the 4 IASI pixel

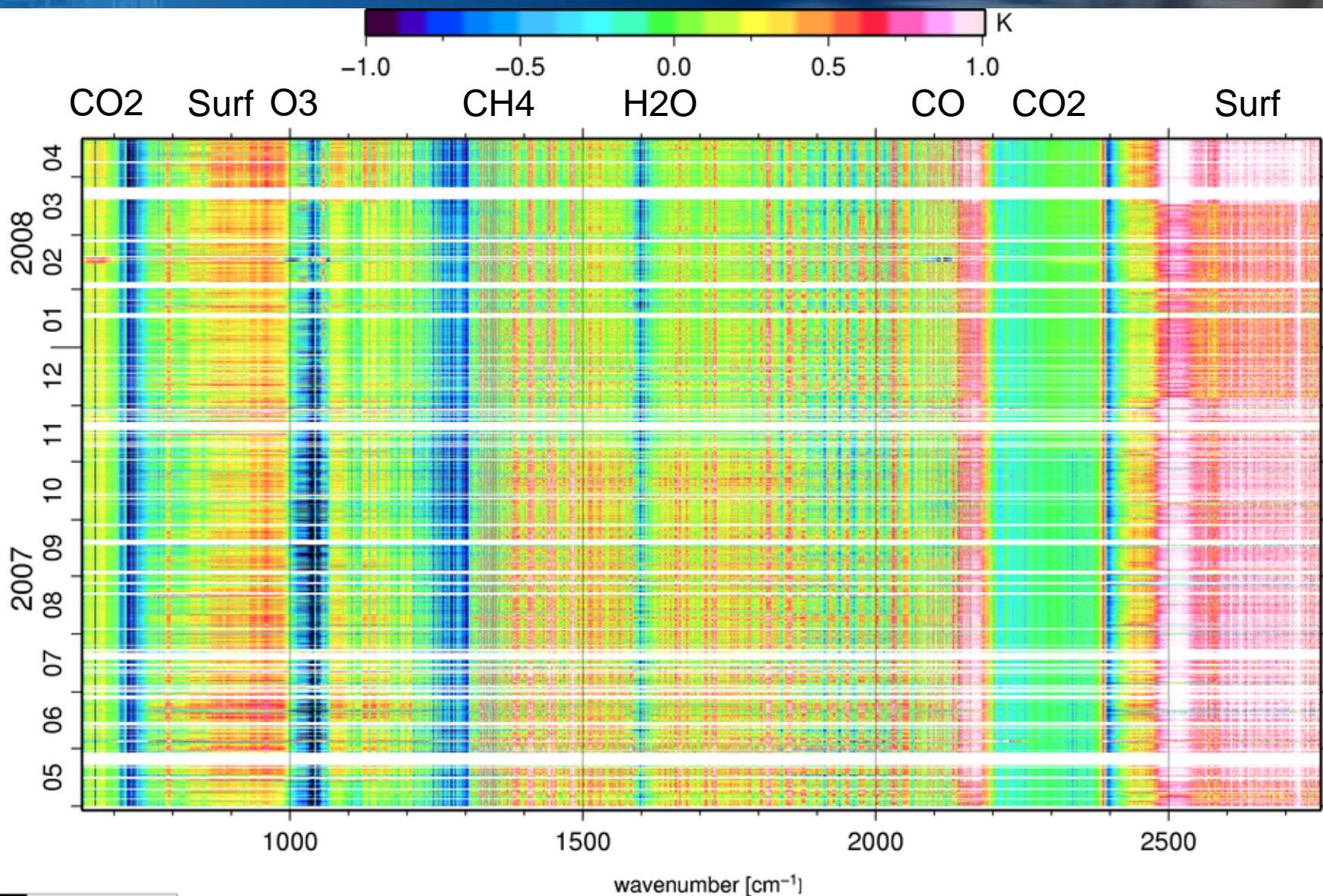
Average radiance bias for each IASI pixel



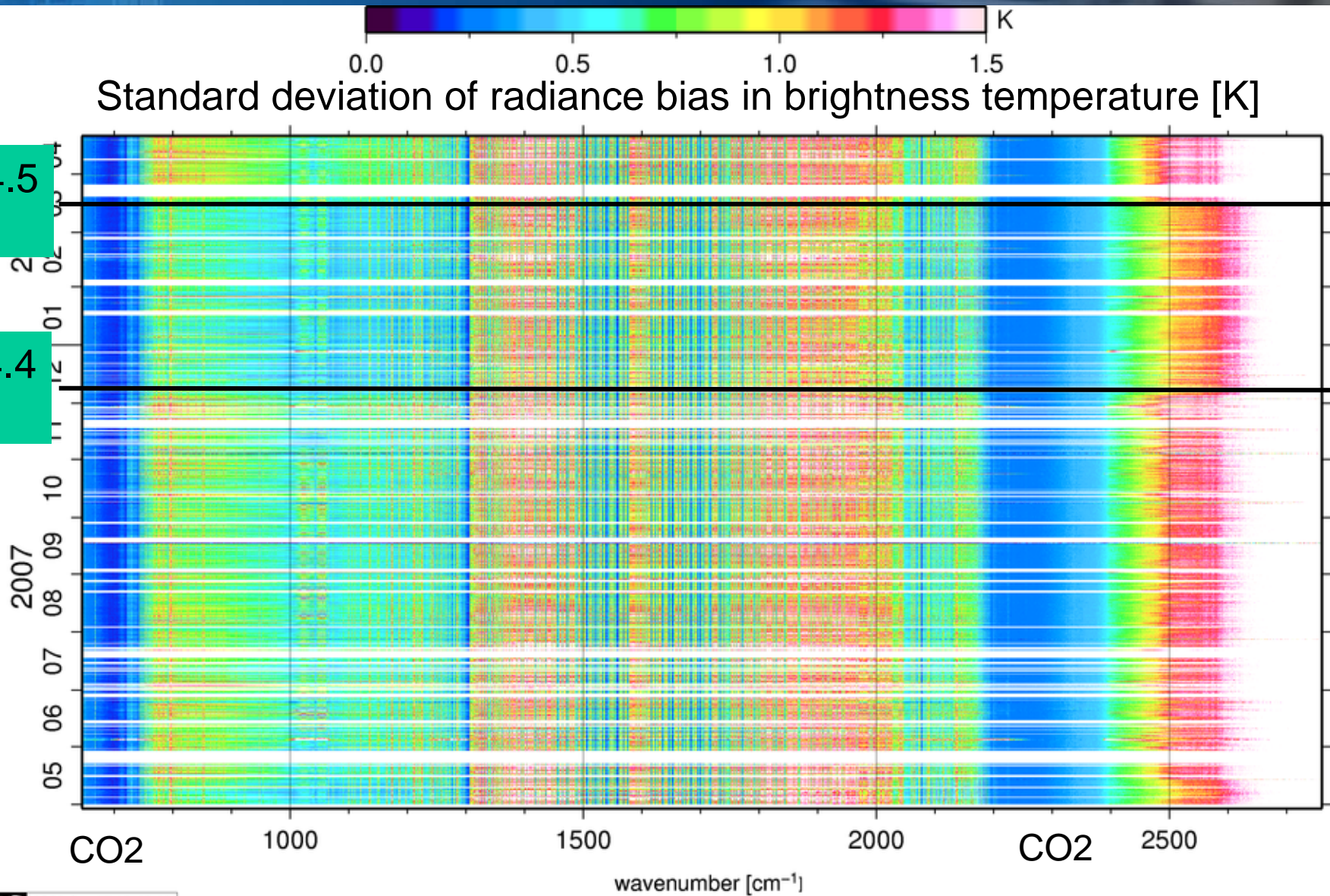
- Radiance bias has no dependency on pixel
- Radiance differences between the 4 pixel are well within specifications



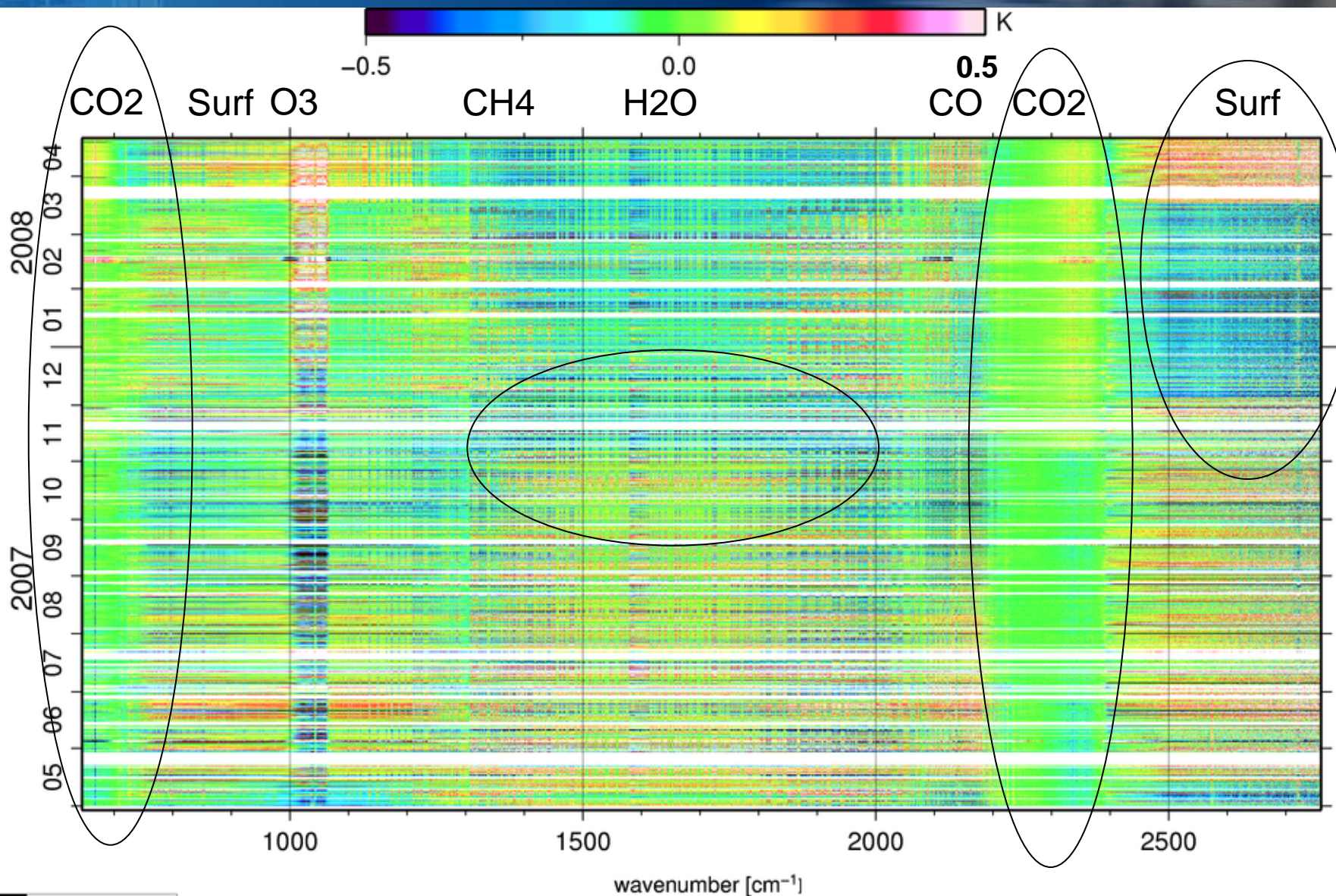
RM: Quarter daily or forecast data average radiance bias in brightness temperature at 280K



RM: Quarter daily or forecast data standard deviation in brightness temperature



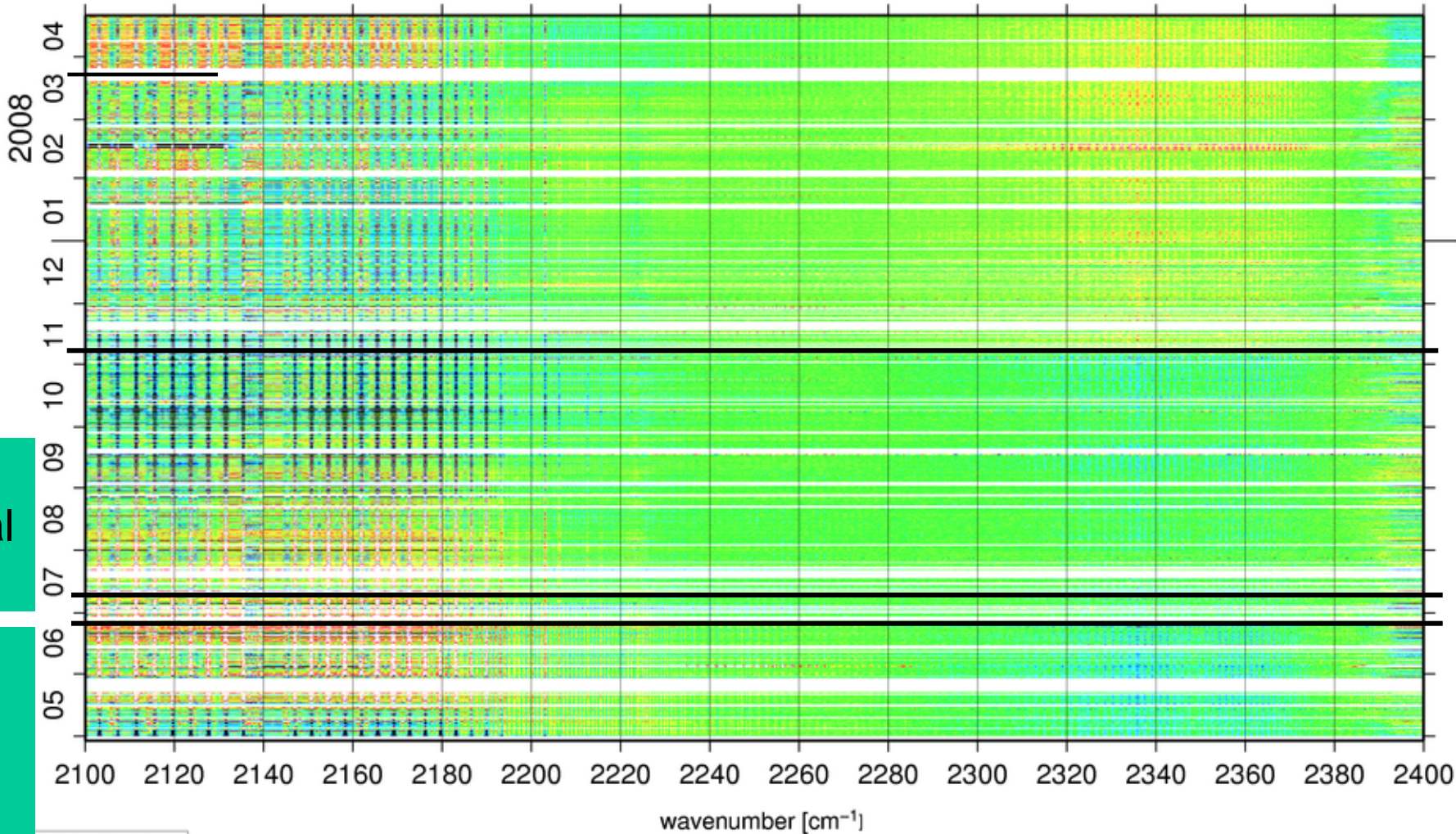
RM: quarter daily or forecast data average with 12 month average bias subtracted





RM: 4 μm CO₂ band radiance anomaly

radiance anomaly in brightness temperature [K]



IASI
Decontamination
24/03/08

ECMWF
32r3-130
06/11/07

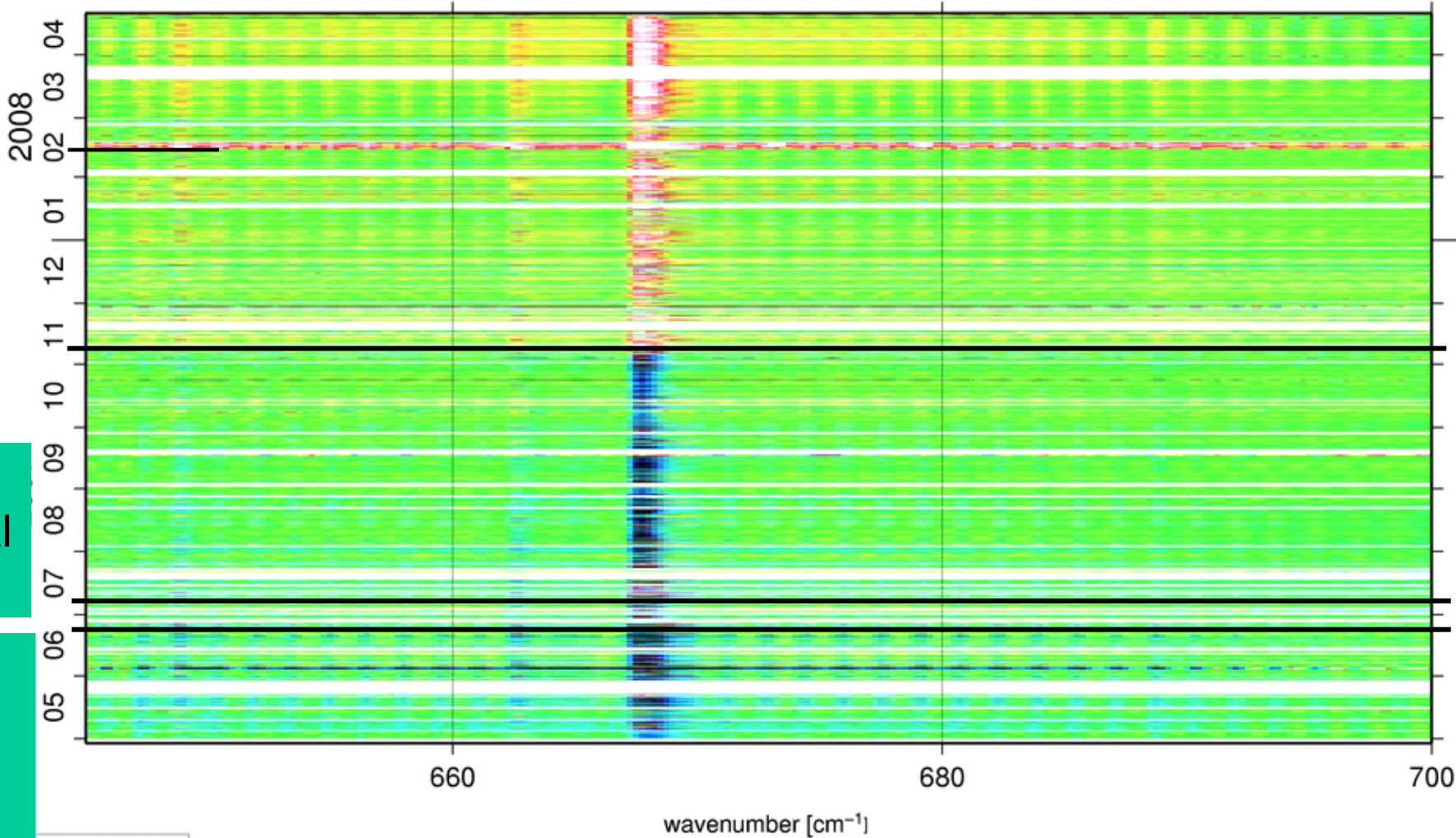
IASI L1
Operational
06/07/07

IASI L1
Cal/Val
Phase B
27/06/07



RM: 14 μm CO₂ band radiance anomaly

radiance anomaly in brightness temperature [K]



EUM
+6h shift
in RM

ECMWF
32r3-130
06/11/07

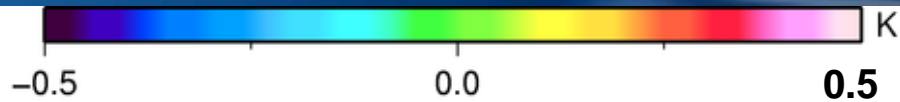
IASI L1
Operational
06/07/07

IASI L1
Cal/Val
Phase B
27/06/07



RM: Band 1 radiance anomaly

radiance anomaly in brightness temperature [K]



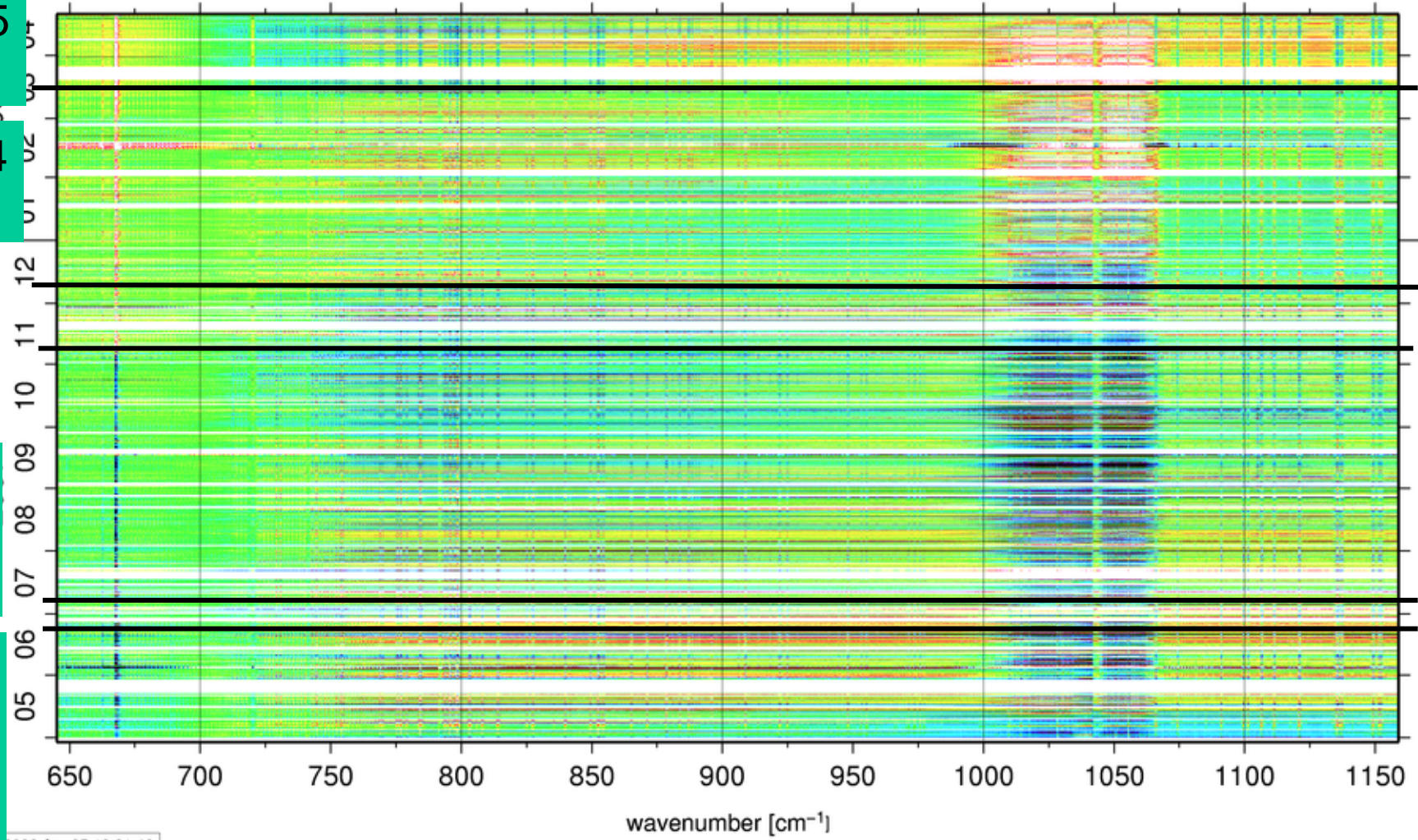
AVHRR V4.5
17/03/08

AVHRR V4.4
07/12/07

ECMWF
32r3-130
06/11/07

IASI L1
Operational
06/07/07

IASI L1
Cal/Val
Phase B
27/06/07





Conclusions

- IASI L1 data quality is very stable above 99% (daily average)
- IASI radiance monitoring shows small and stable differences between observation and calculations
- Systematic radiance bias changes in the operational phase were not related to IASI
- The IASI decontamination in March 2008 had no impact on radiance bias
- The selection of situations in RM does not represent the full atmospheric variability of the atmosphere but
- Enables radiance monitoring that is capable of recognizing small RM system changes (IASI, NWP, AVHRR)
- Improvements on RM can be achieved by using 3h forecast data



Outlook: IASI L1C Day-2 product content

The following changes are foreseen to improve the IASI L1C product in 2009:

- 1. Provision of cloud fraction for each IASI FOV based on AVHRR L1B cloud mask.**
- 2. Provision of sea fraction for each IASI FOV based on AVHRR L1B.**
- 3. Provision of individual quality indicators (GQISFLAGQUAL) for the 3 IASI bands of every IASI FOV because effect of SAA is mainly affecting Band 3 (95% of all impacts are in Band 3).**



RM: 14 μm CO₂ – 10 channel average

Channel number: 115, 121, 127, 134, 140, 147, 153, 160, 166, 172
673.75, 675.25, 676.75, 678.5, 680.0, 681.75, 683.25, 685.0, 686.5, 688.0 cm⁻¹

