

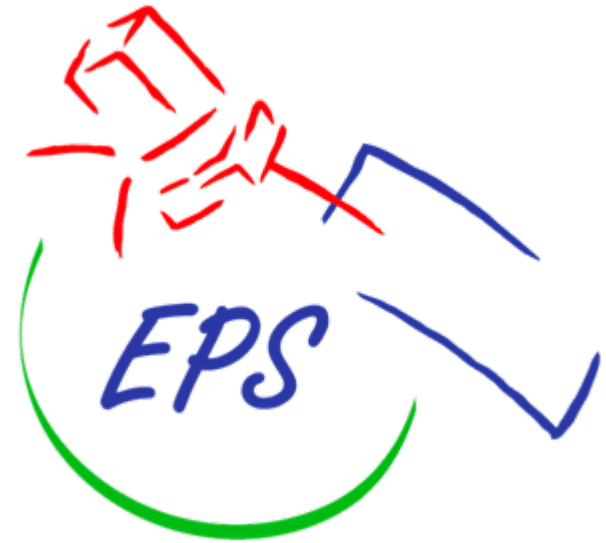


EUMETSAT Polar System (EPS)

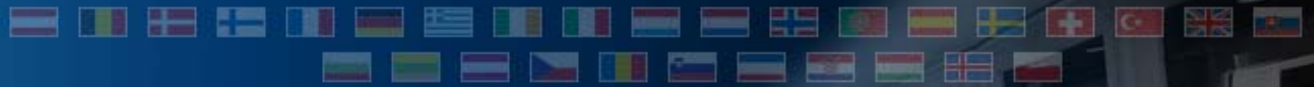
Synergetic Operational Earth Observations with the EPS/MetOp System

Dieter Klaes

EPS Programme Scientist



Outline



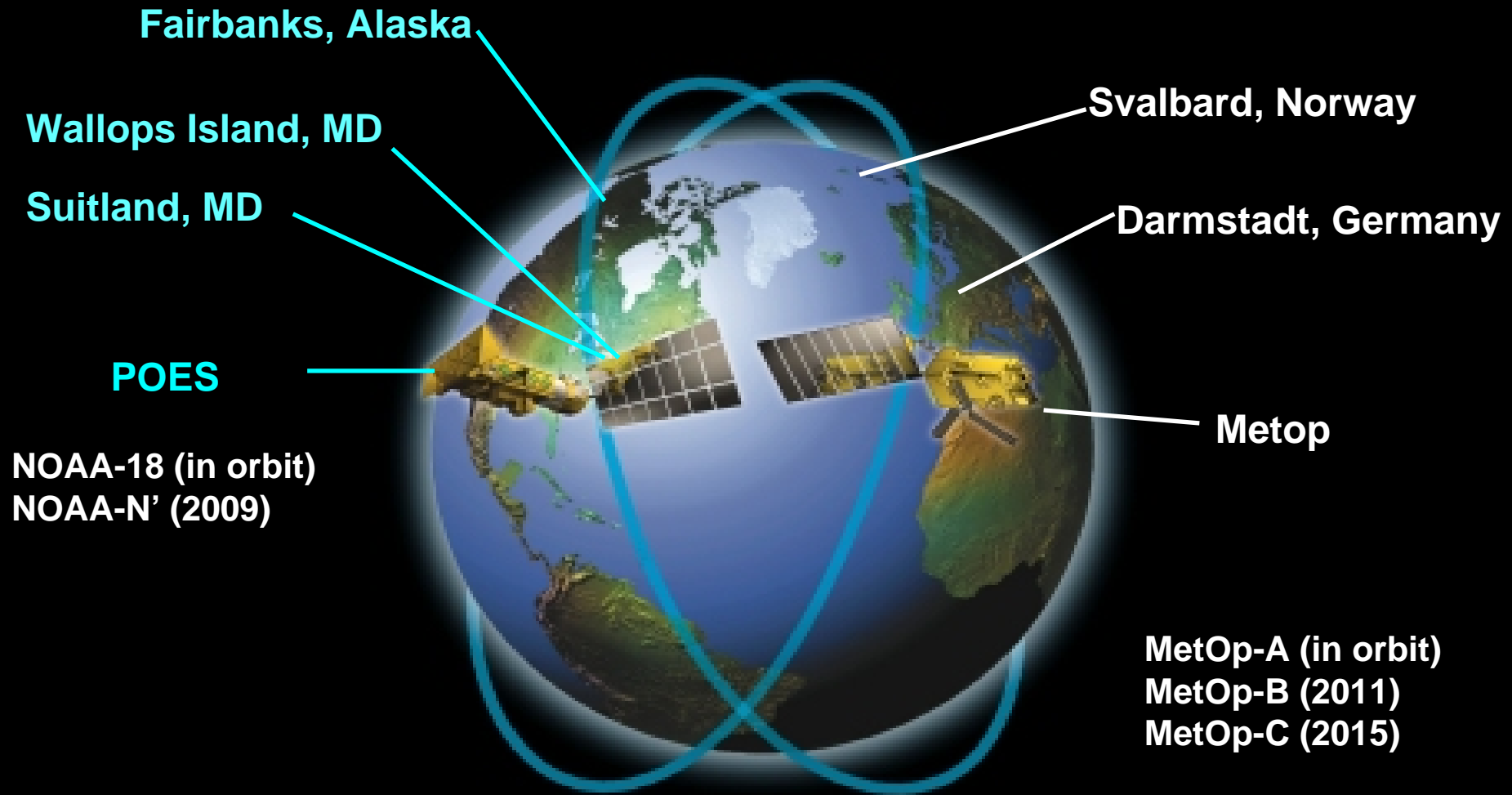
1. Introduction
2. EPS System and Observations
3. Outlook



1. Introduction



Initial Joint Polar System (IJPS)



- EUMETSAT-NOAA coordinated programmes
- Exchange of instruments (ATOVS, AVHRR from NOAA, MHS from EUMETSAT)
- Coordinated operations, data and services
- Extended agreement in 2003 to include MetOp-C

Sun-synchronous
Orbit of 102 minutes
14.1 orbits per day

2. EPS System: Ground Segment

EPS Services

Local mission: Real-time transmission of imaging and sounding data to local user stations

Global mission: Delivery of global measurements to National Meteorological Services of Member and Cooperating States and NOAA within 2.25 hours of the instant of observation (GTS, EUMETCast)

Search and Rescue Service

Direct Readout User

IASI TEC

8 SAF

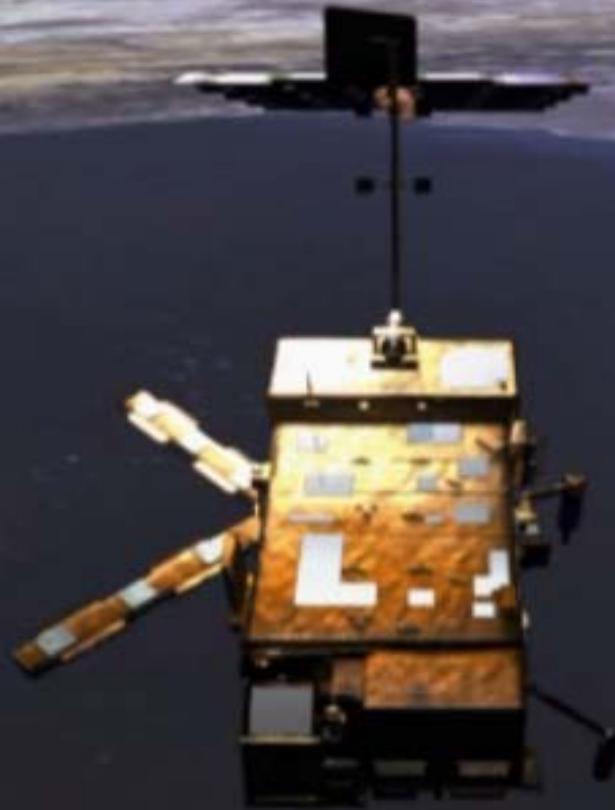
Users

Central Ground Segment

- Global Level 1 and Level 2 products
- Archive for all mission products (UMARF)

DCP (data collection)
of in-situ observational
data

2. EPS System: Space segment



The MetOp satellites

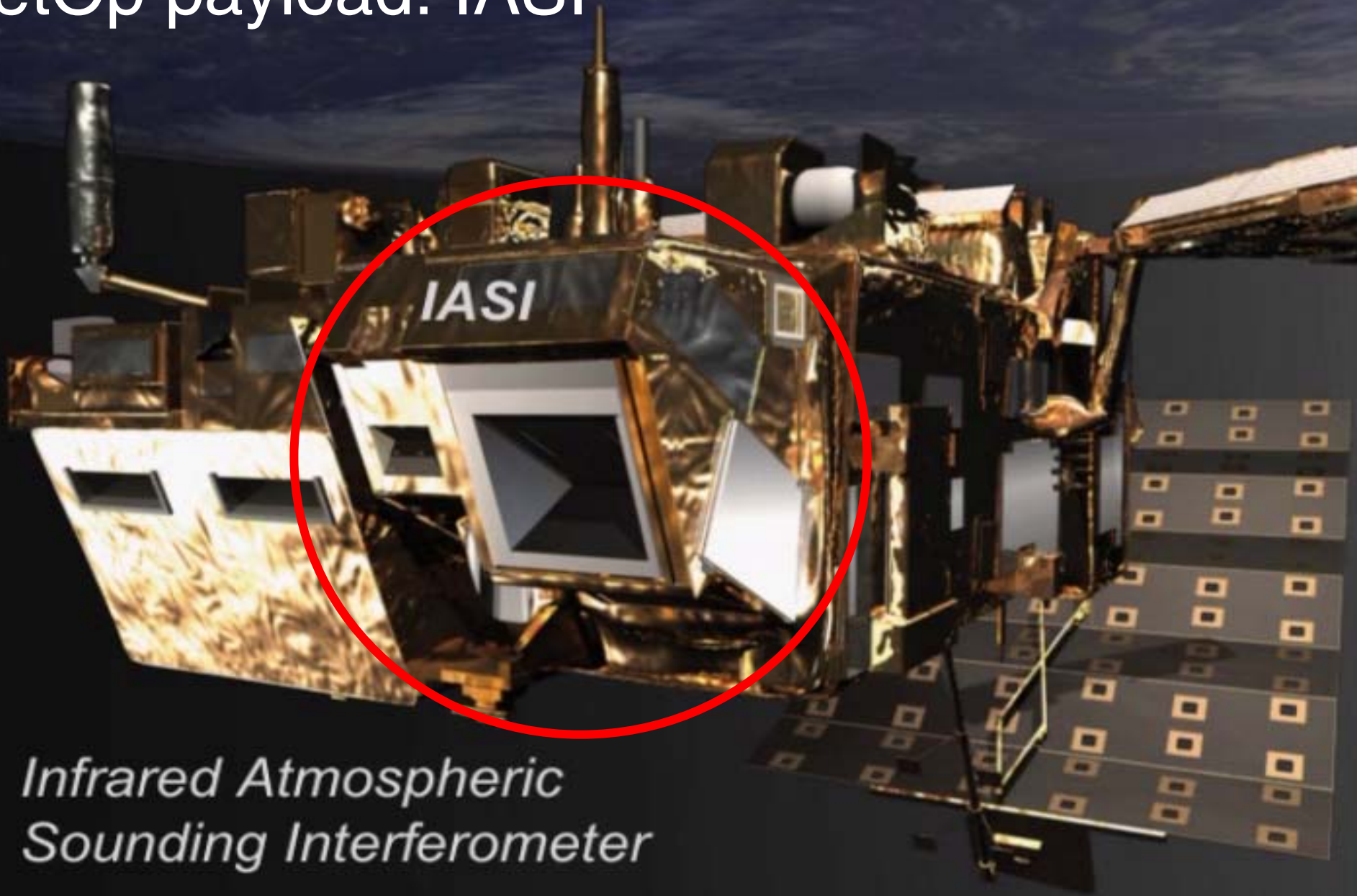
Launch from the Baikonour Cosmodrome with Sojuz/Fregat the 19th October 2006



The payload supports a number of missions

- **Atmospheric Sounding**
(temperature, humidity, O₃/trace gases):
 - **IR/MW** sounders:
HIRS-4/IASI, AMSU-A/MHS
 - **UV/VIS** sounder:
GOME-2
 - **Radio occultation** limb sounder:
GRAS
- **Global VIS/IR Imagery**: AVHRR/3
- **Wind vectors** over the ocean: ASCAT
- Data location and collection:
ARGOS Terminal
- Global and local data access:
solid state recorder (on board memory) /HRPT/LRPT
- Search & Rescue Terminal

MetOp payload: IASI

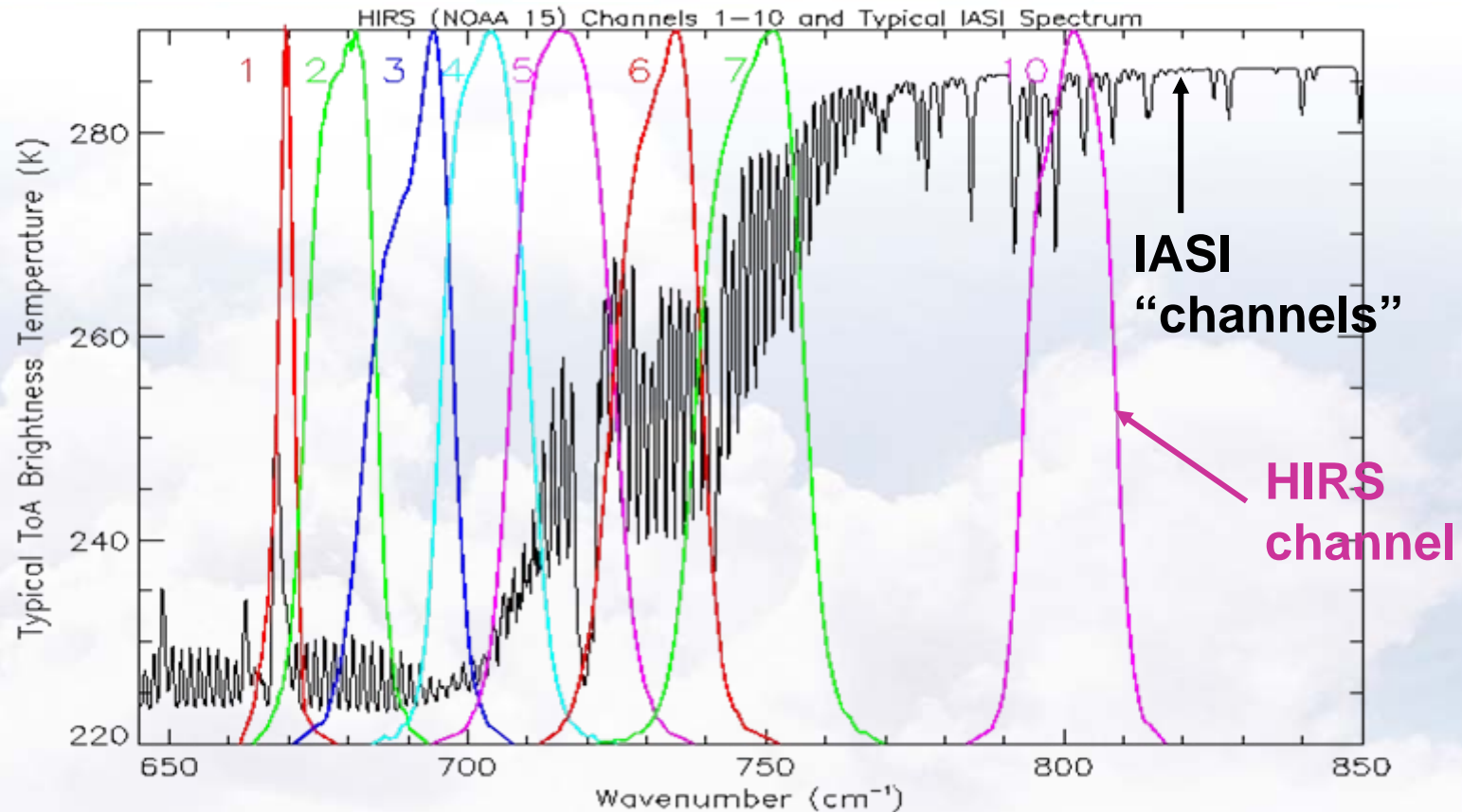


*Infrared Atmospheric
Sounding Interferometer*

The background of the slide is a composite image. In the top left, there is a close-up of the IASI (Infrared Atmospheric Sounding Interferometer) instrument, showing its complex internal components and red structural elements. In the top right, a satellite is shown in orbit, with a red laser beam directed from its payload towards the Earth's surface. The Earth is visible below, showing a mix of blue oceans and brown/green landmasses, with a soft orange glow from the atmosphere at the horizon.

IASI Products

A Major Step Forward In Infrared Sounding



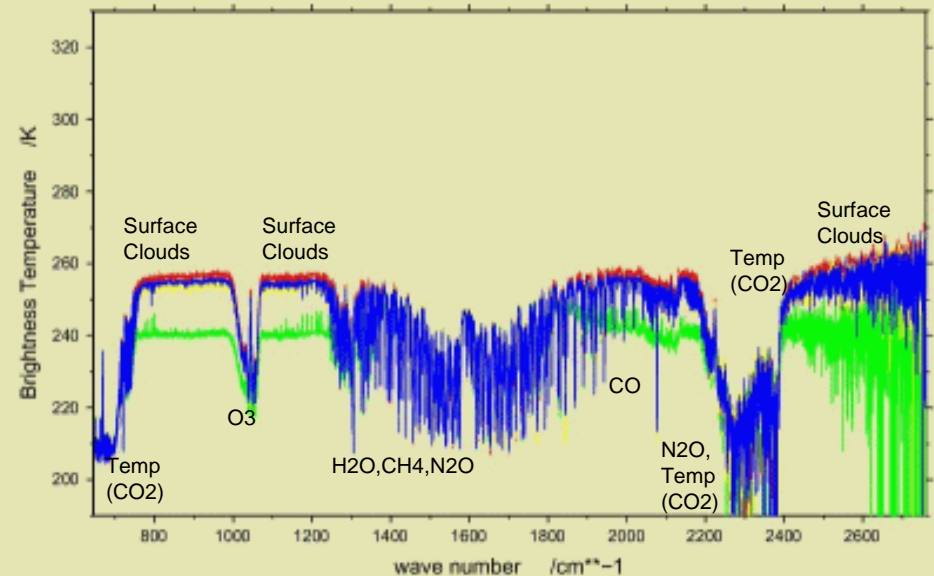
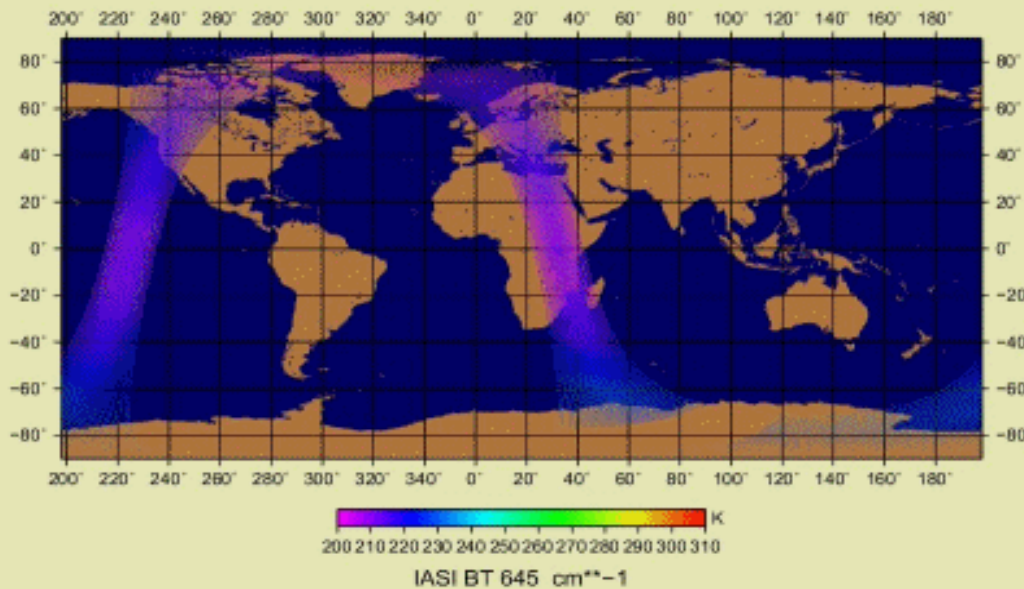
HIRS 19 channels vs IASI 8461 spectral samples





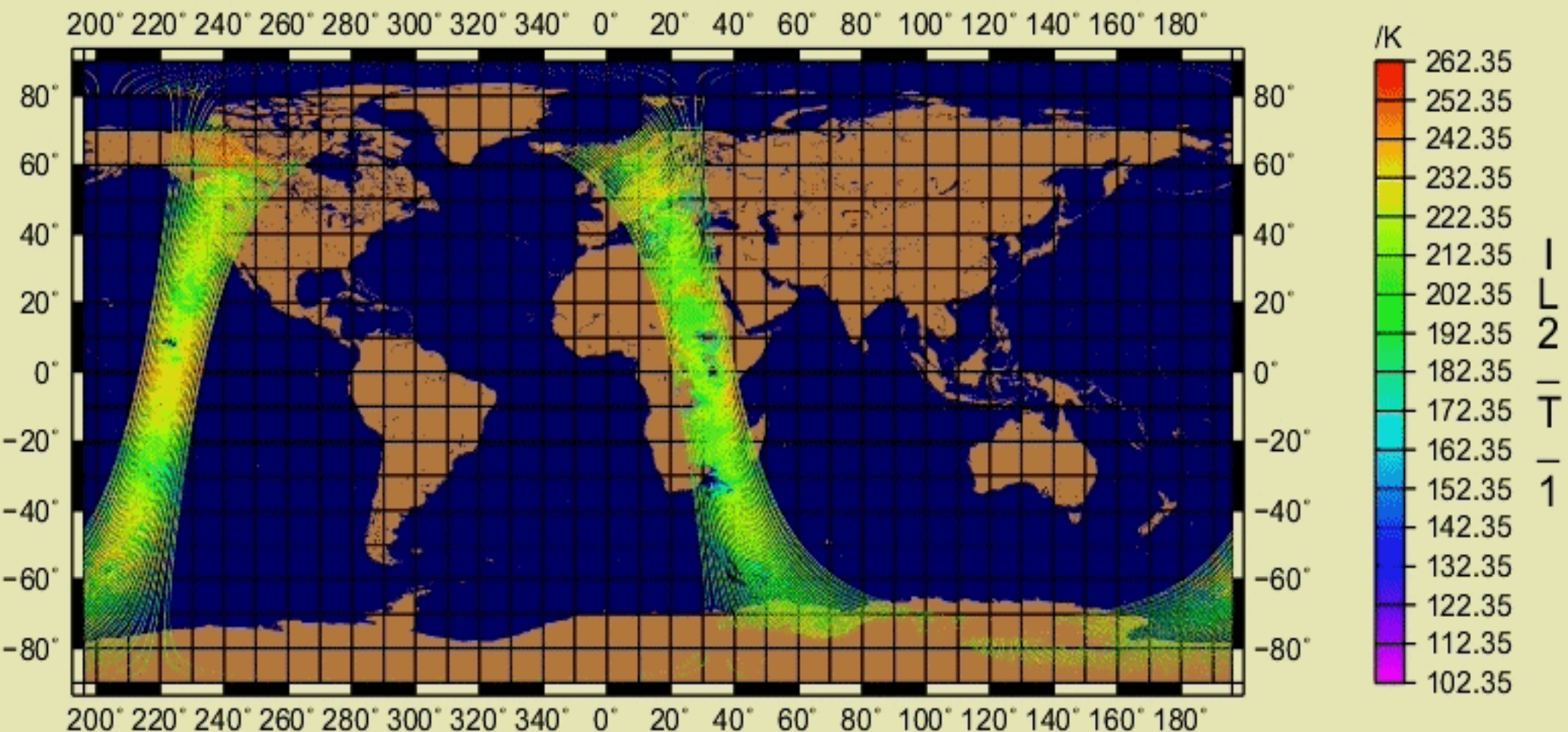
IASI provides a wealth of IR sounding information

IASI MetOp-A 15 January 2007 18:08-19:52 UTC



IASI Level 2 sounding product

Metop-A 22/10/2007 181459-200320UTC



MetOp payload: ATOVS

MHS
Microwave Humidity Sounder

HIRS/4
High Resolution Infrared
Radiation Sounder

AMSU-A1

AMSU-A2

Advanced
Microwave
Sounding Unit



ATOVS and AVHRR Products





...the ATOVS sounders provide information

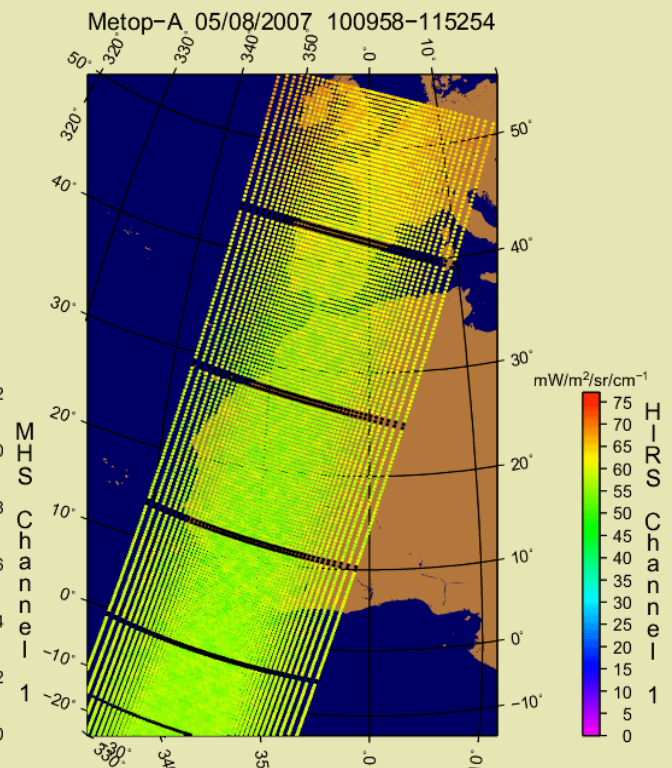
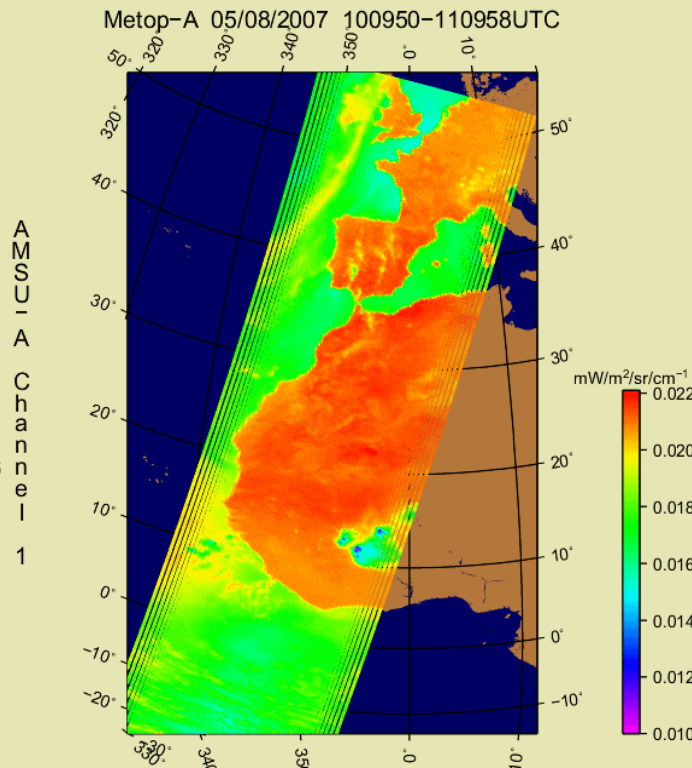
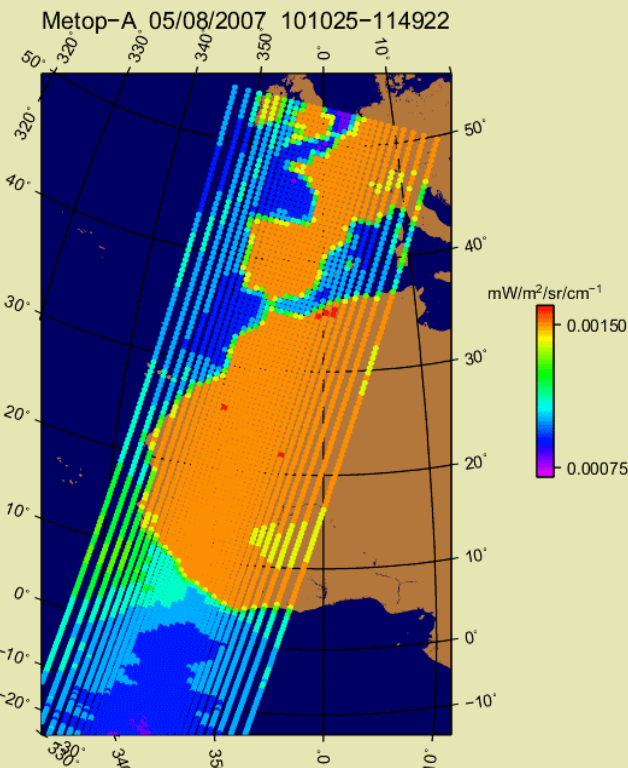
In the microwave region

In the infrared region

AMSU-A

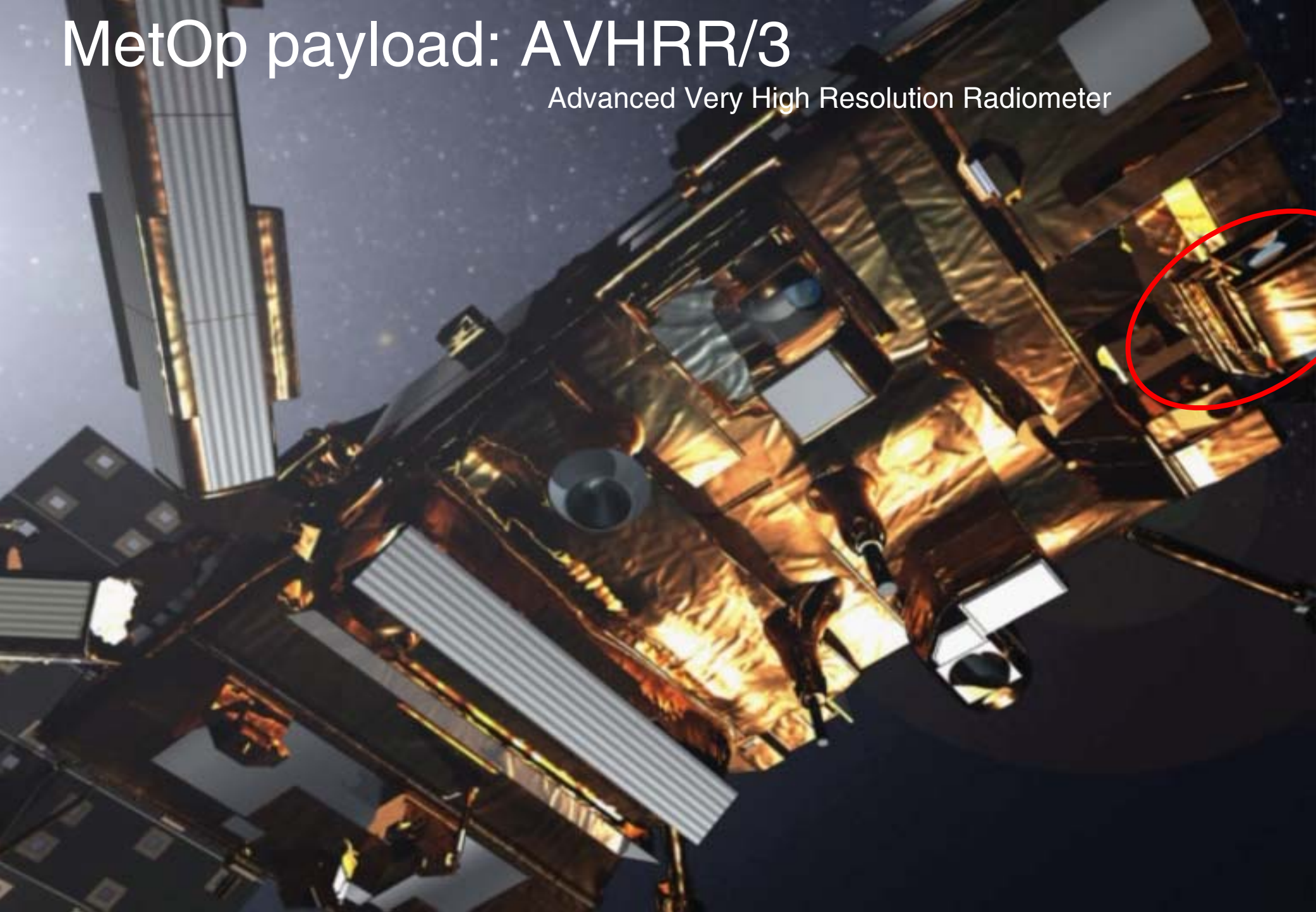
MHS

HIRS/4



MetOp payload: AVHRR/3

Advanced Very High Resolution Radiometer



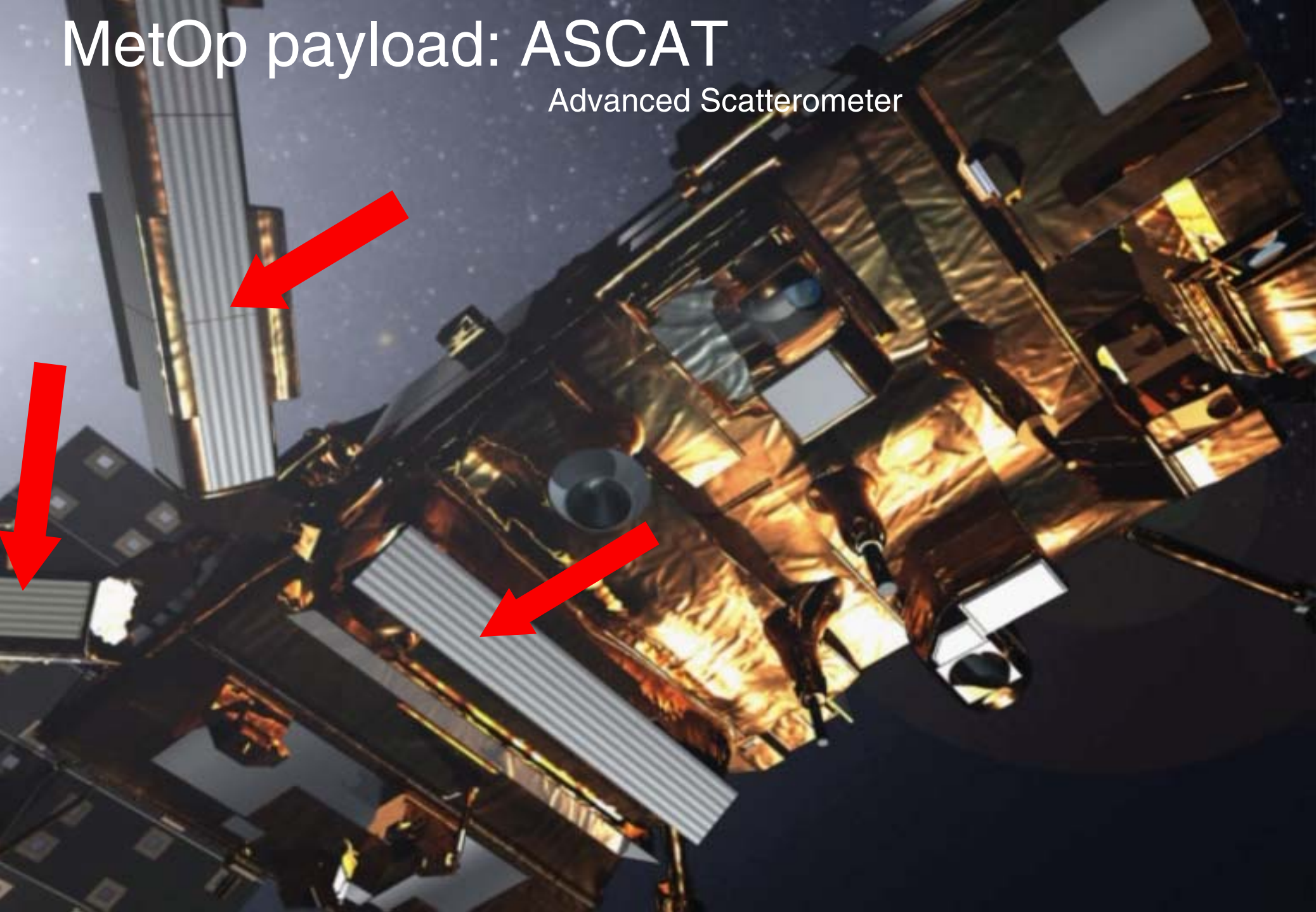


...and are supported by the AVHRR Imager

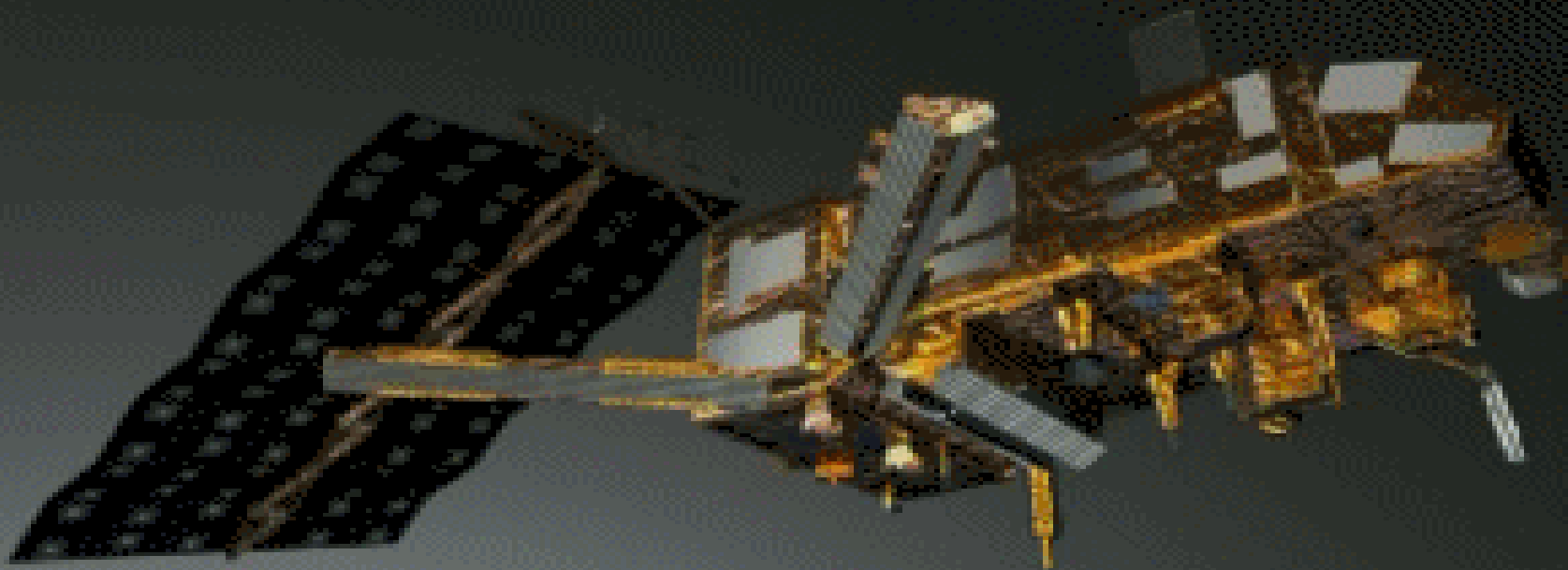
Global AVHRR/3 products are available at full resolution
MetOp-A AVHRR/4 Level 1b RGB 324 05 August 2007 1010Z

MetOp payload: ASCAT

Advanced Scatterometer

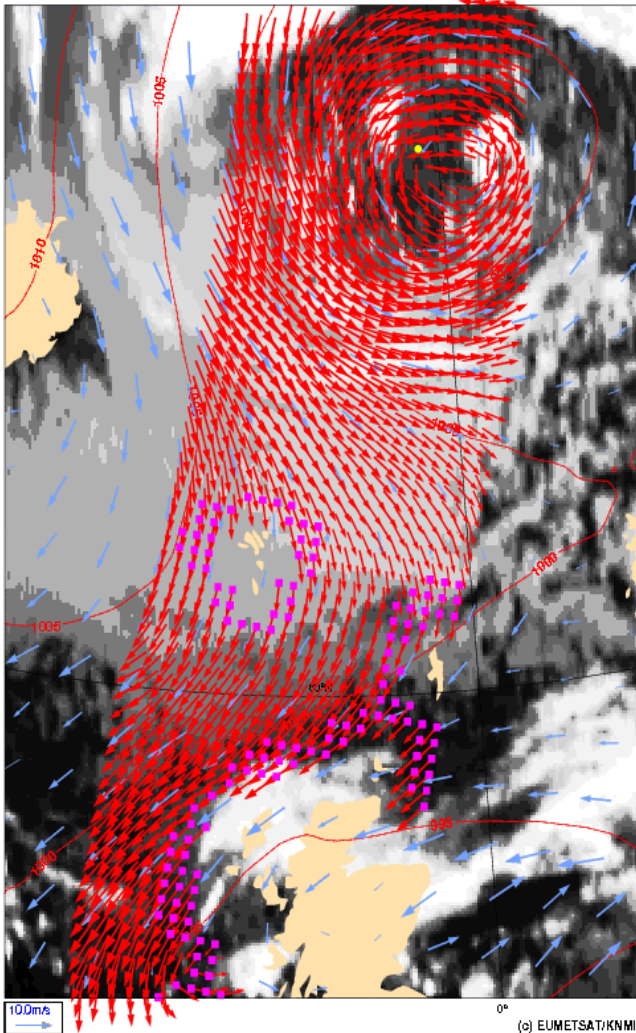


3.4 ASCAT Products

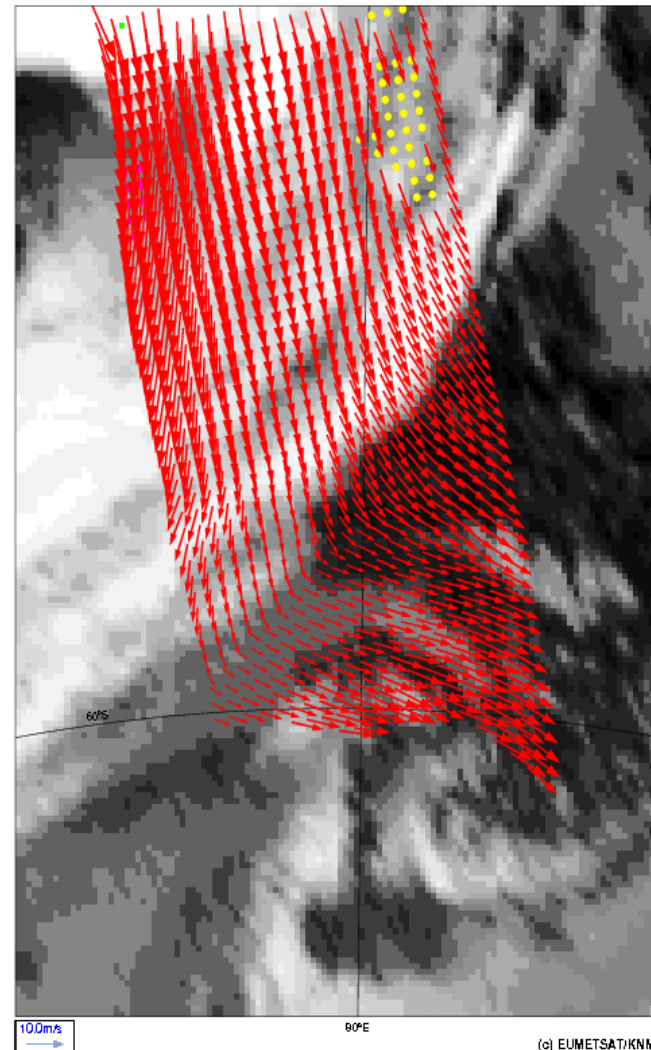


The OSI-SAF is providing wind products

ASCAT: 20070510 10:30Z HIRLAM: 2007051003+6 lat lon: 62.72 -4.75 IR: 10:30



ASCAT: 20070509 16:30Z HIRLAM: 2007050909+6 lat lon: -57.33 79.31 IR: 16:30



KNMI, 2007



MetOp payload: GOME-2



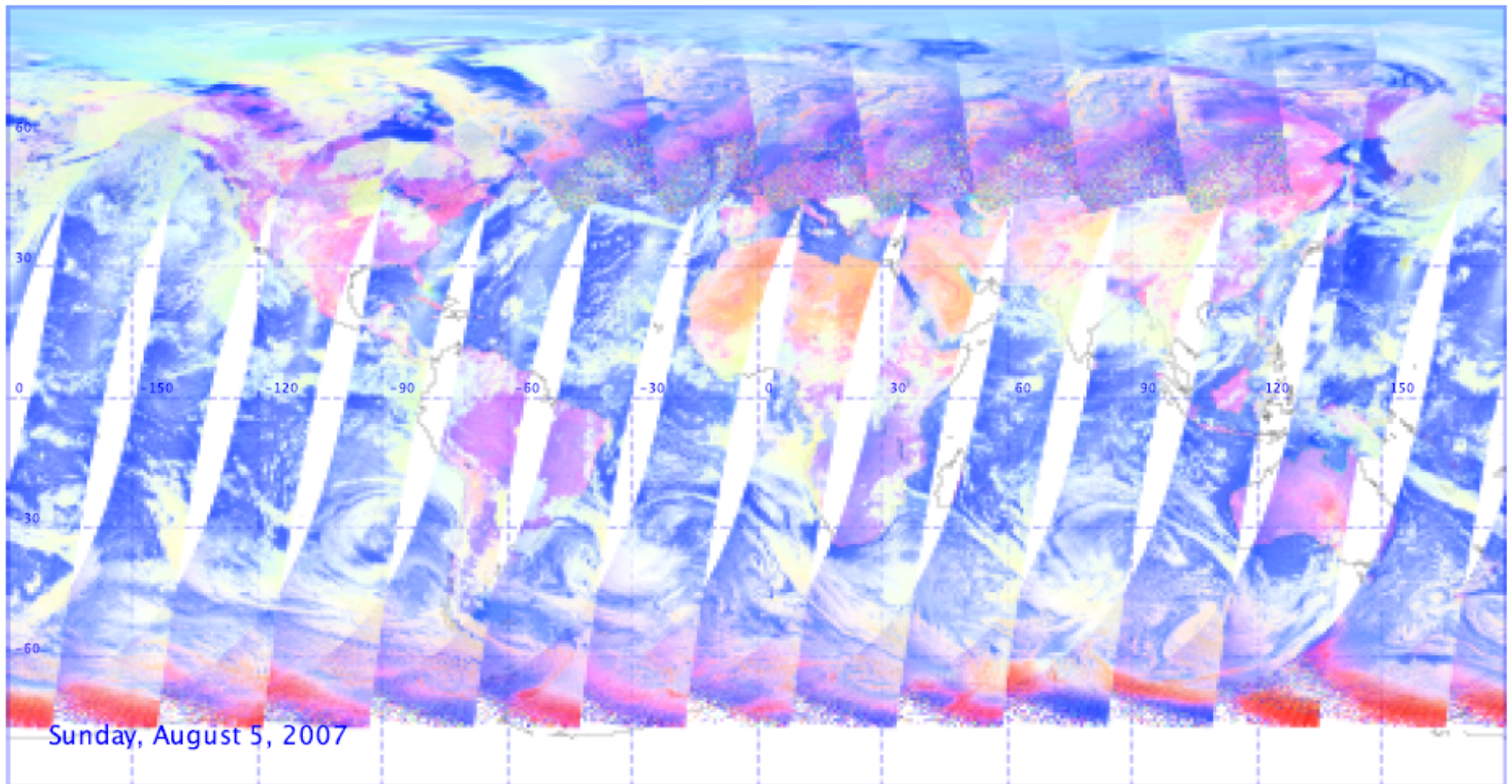
3.3 GOME-2 Products



Polarisation Measurement Device (PMD) helps monitoring

False colour image

2007-08-05 00:00:00 2007-08-05 23:59:59

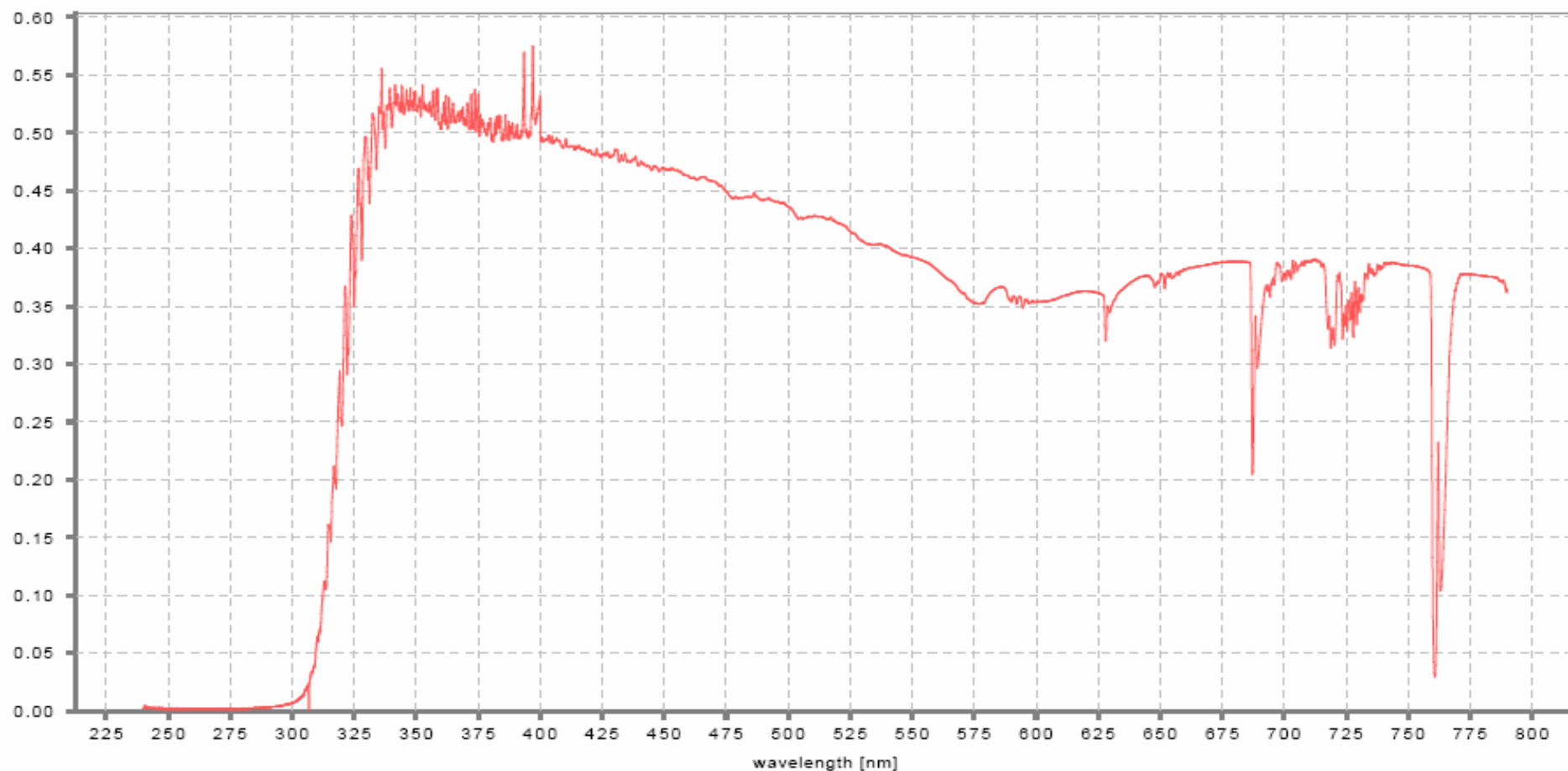




Reflectance

Reflectance (Greenland)

2007-08-05 00:00:00 2007-08-05 23:59:59



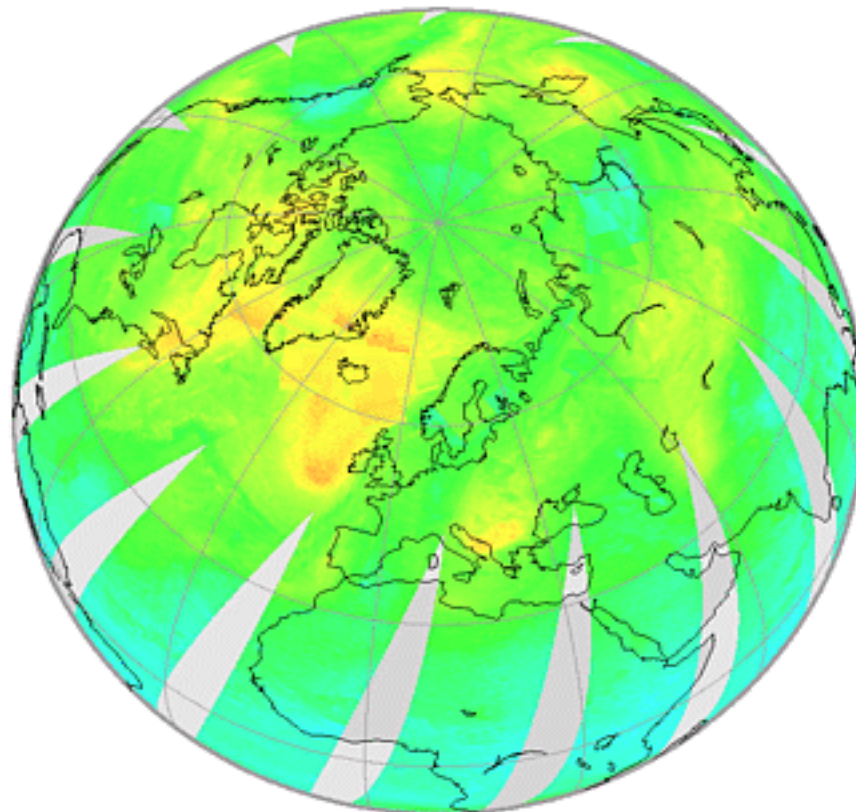
Ozone Monitoring from the O3M SAF

GOME-2 / MetOp

Ozone Vertical Column Density

Aug 05, 2007

Northern Hemisphere

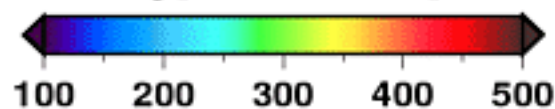


One-day Composite

Lv2 Version: GDP-4.2

<http://wdc.dlr.de>

O₃ [Dobson Units]



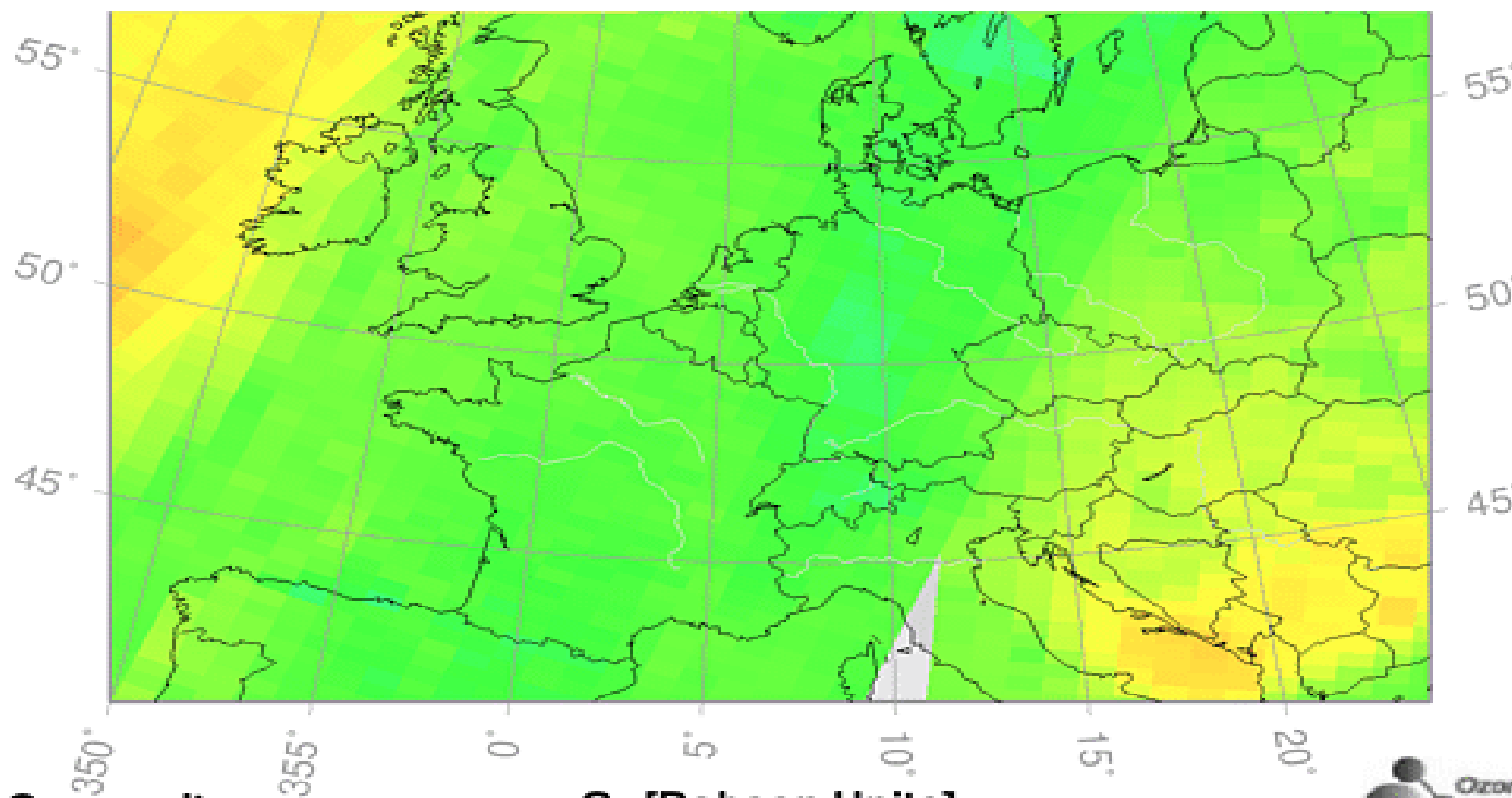
Ozone Monitoring from the O3M SAF

GOME-2 / MetOp

Aug 05, 2007

Ozone Vertical Column Density

Central Europe



One-day Composite

Lv2 Version: GDP-4.2

<http://wdc.dlr.de>



MetOp payload: GRAS

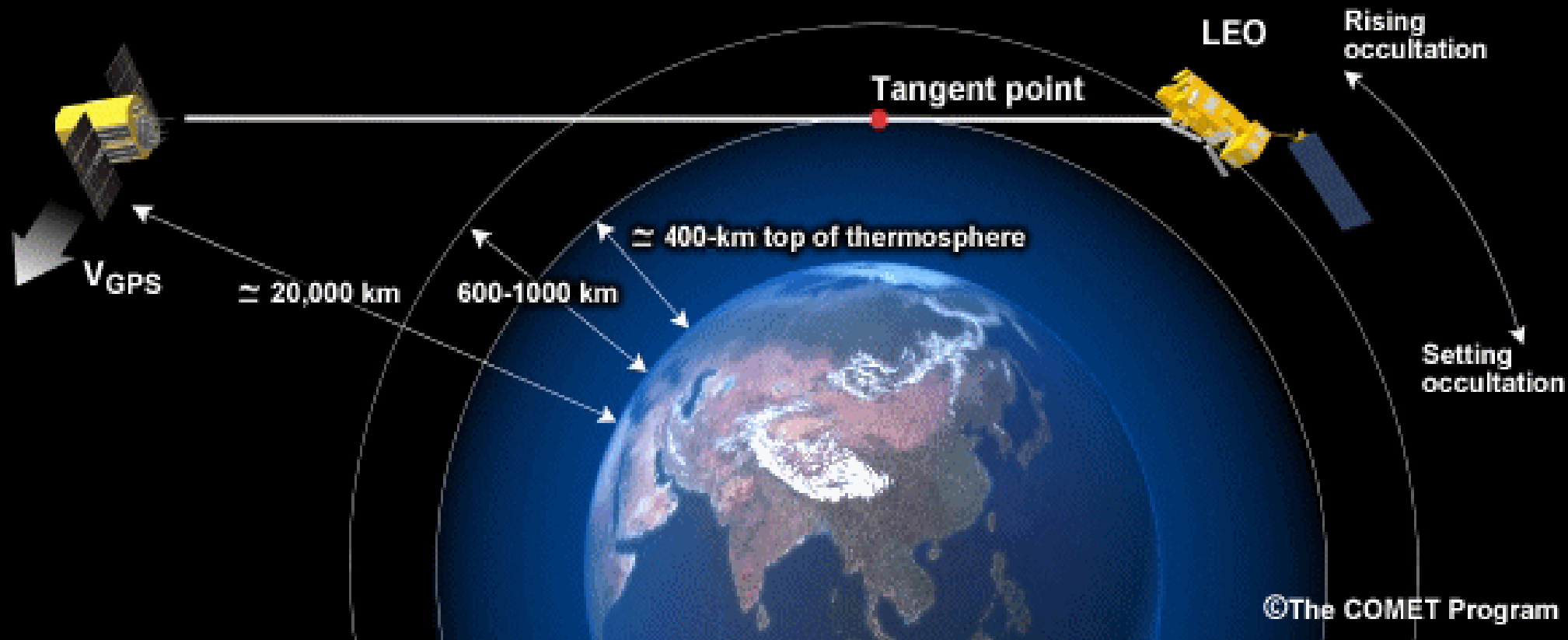
GNSS Receiver for
Atmospheric Sounding



3.5 GRAS Products

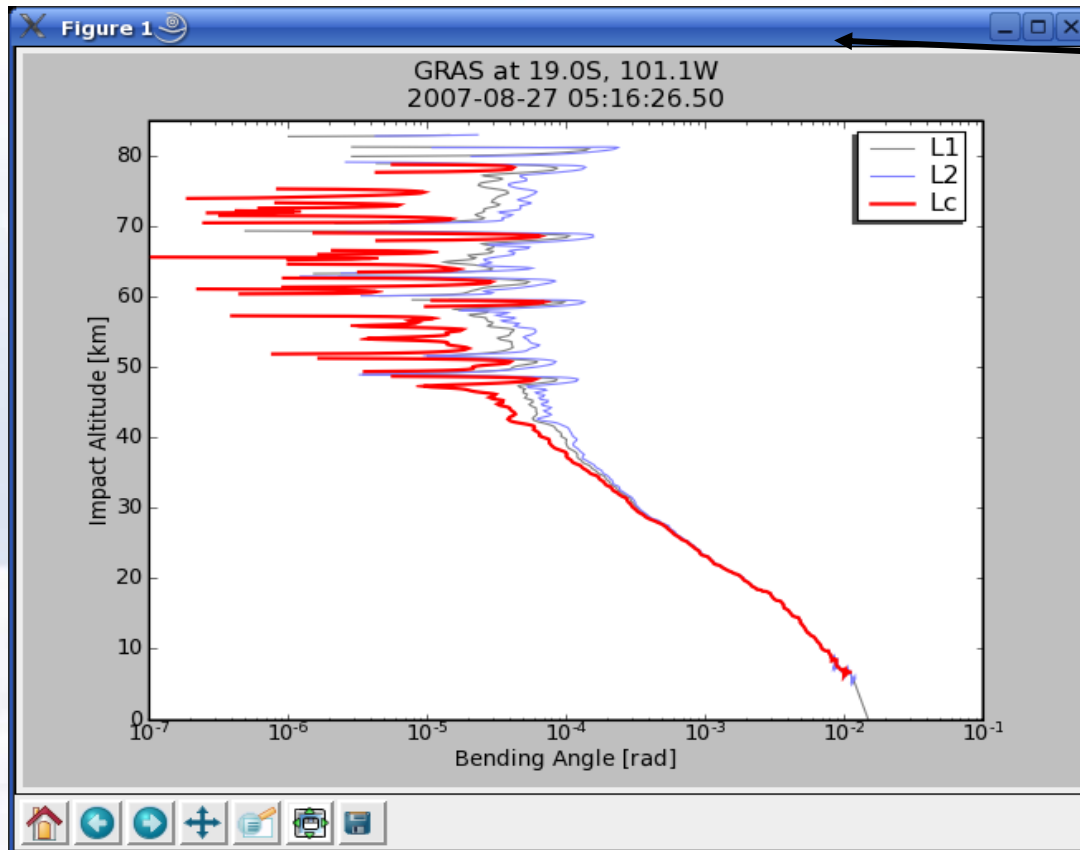


GRAS: Limb Sounding by Occultation of GPS Signals



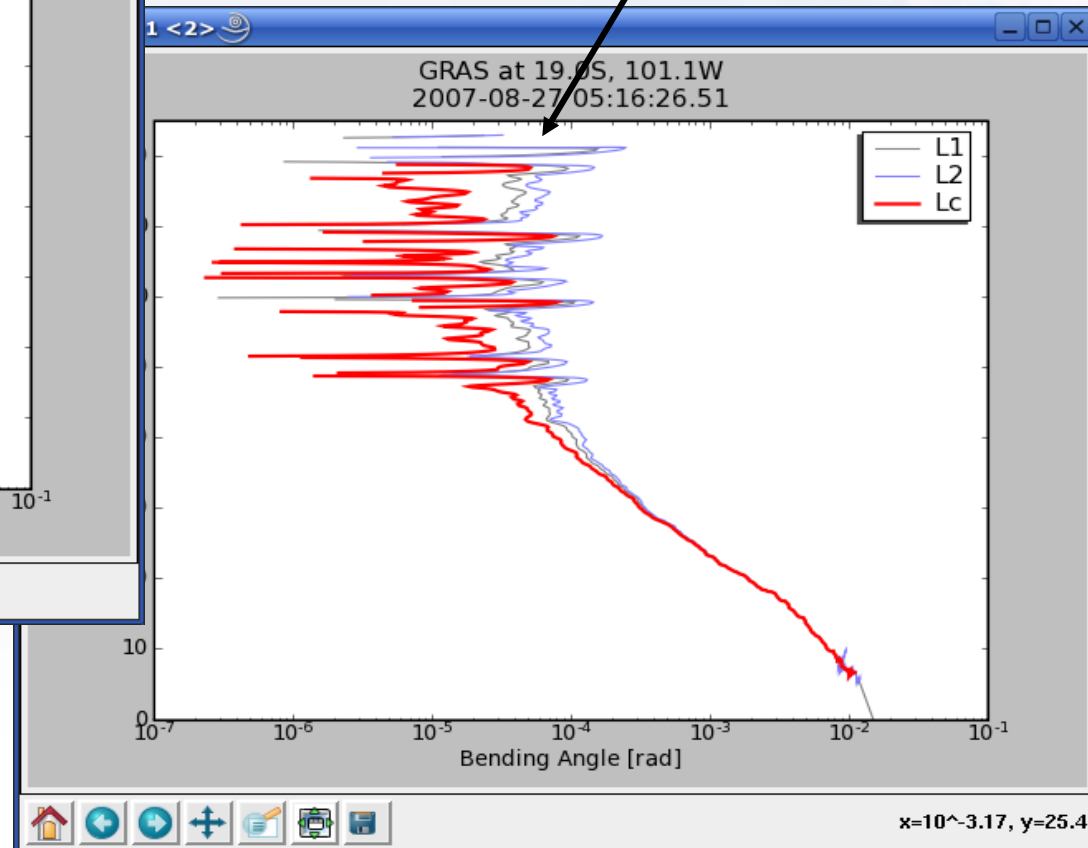
GRAS Level 1b product : bending angles

the GRAS team, 2007



GS1

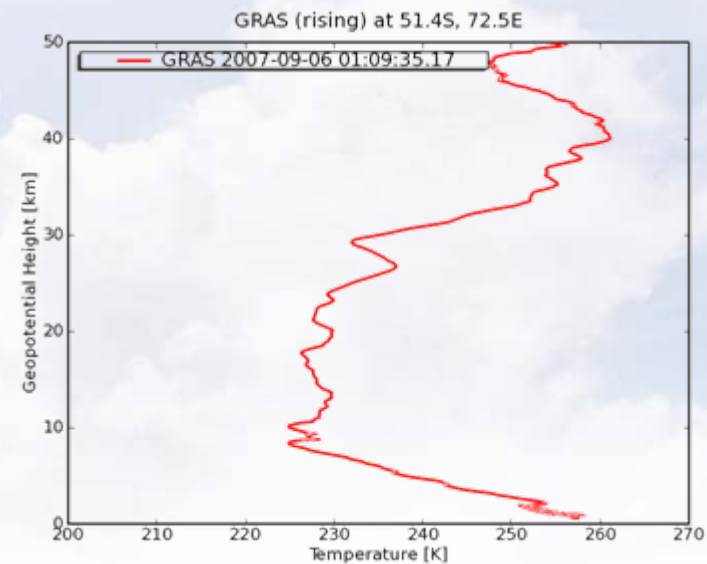
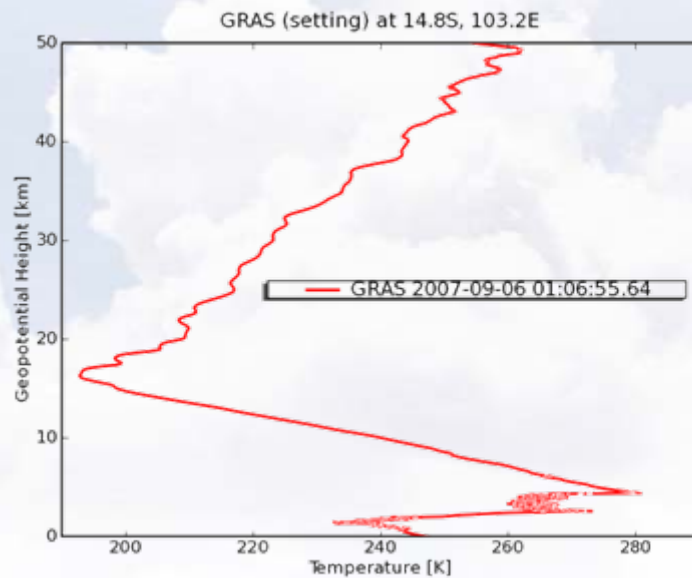
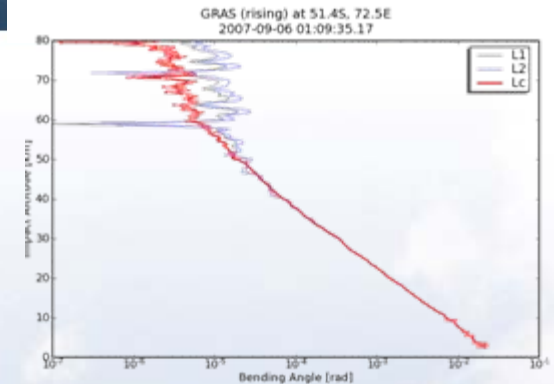
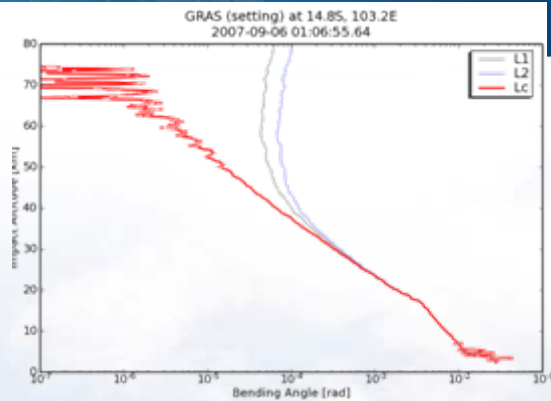
GS2



GRAS requirement:
Max abs error < 1 μ rd



...and the retrievals with (SF only)



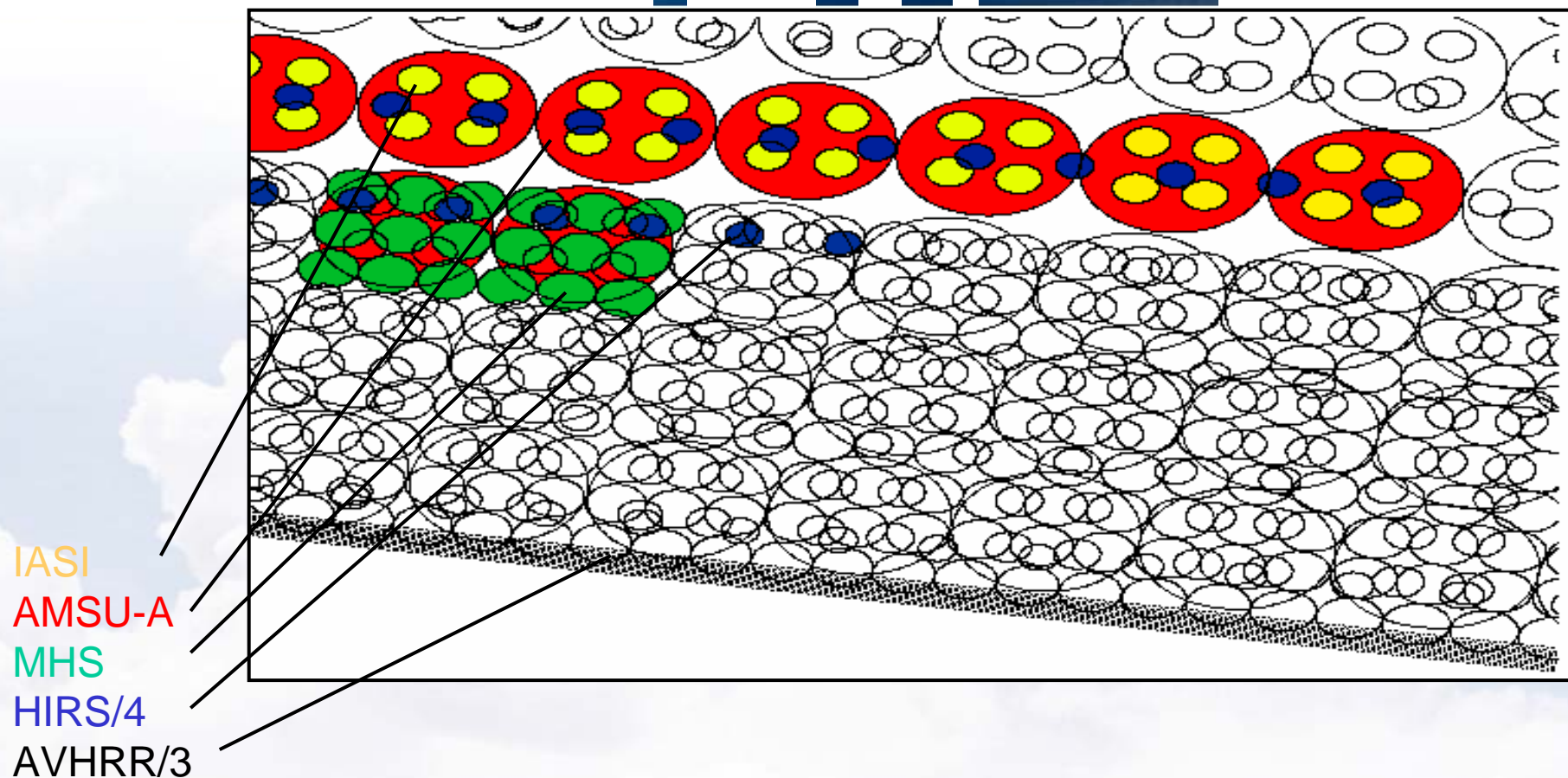
Marquardt, 2007



3 Outlook



Synergetic use of data

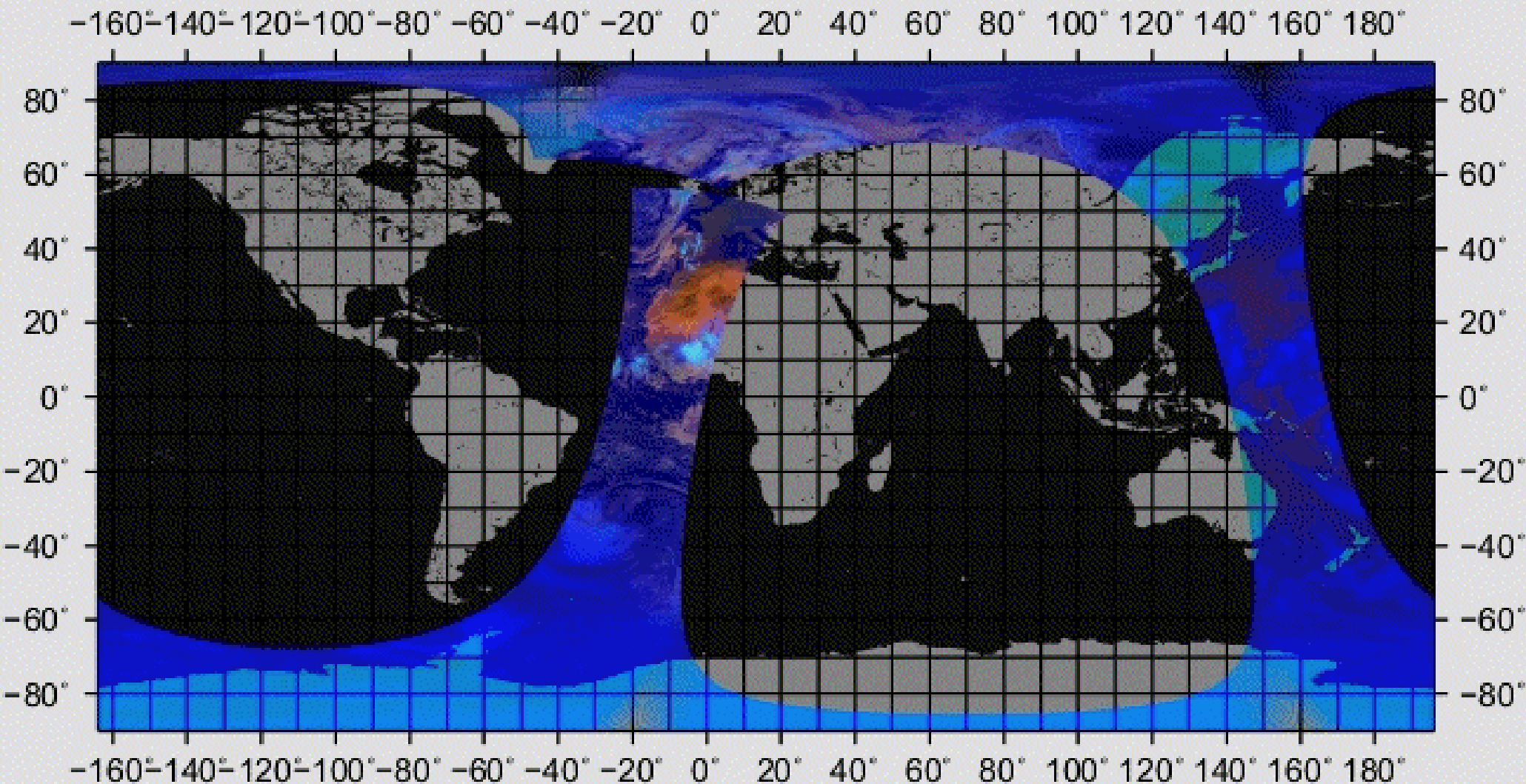


Instrument Scan Pattern → Synergetic use of data



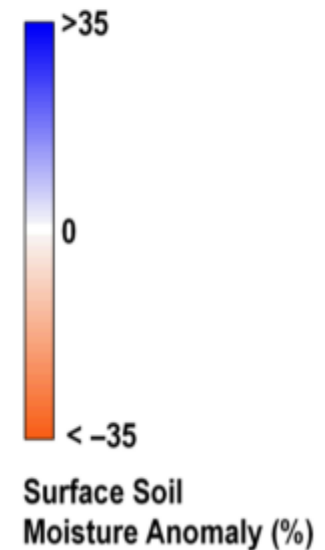
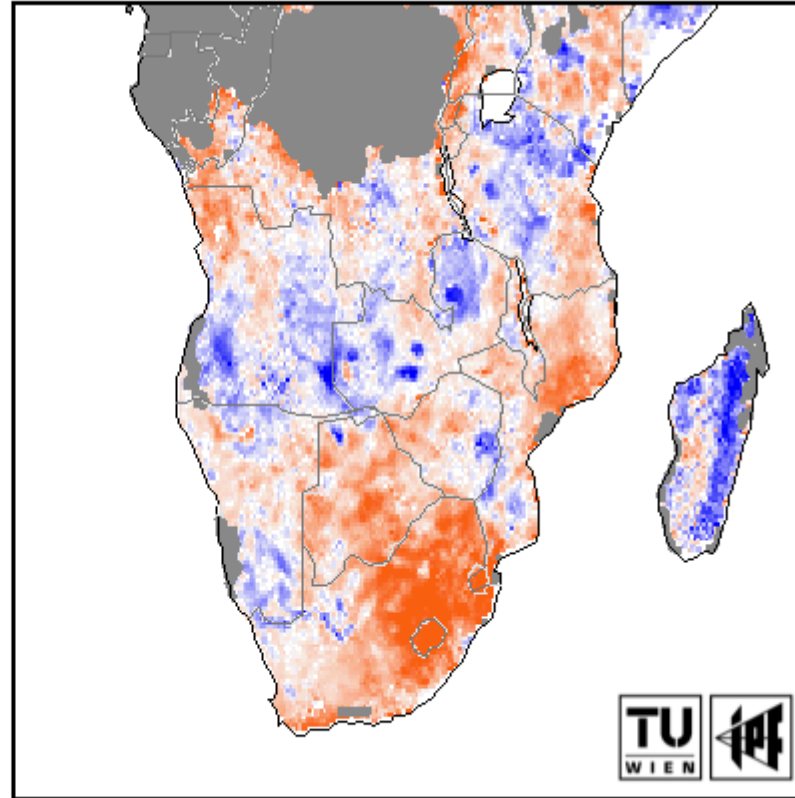
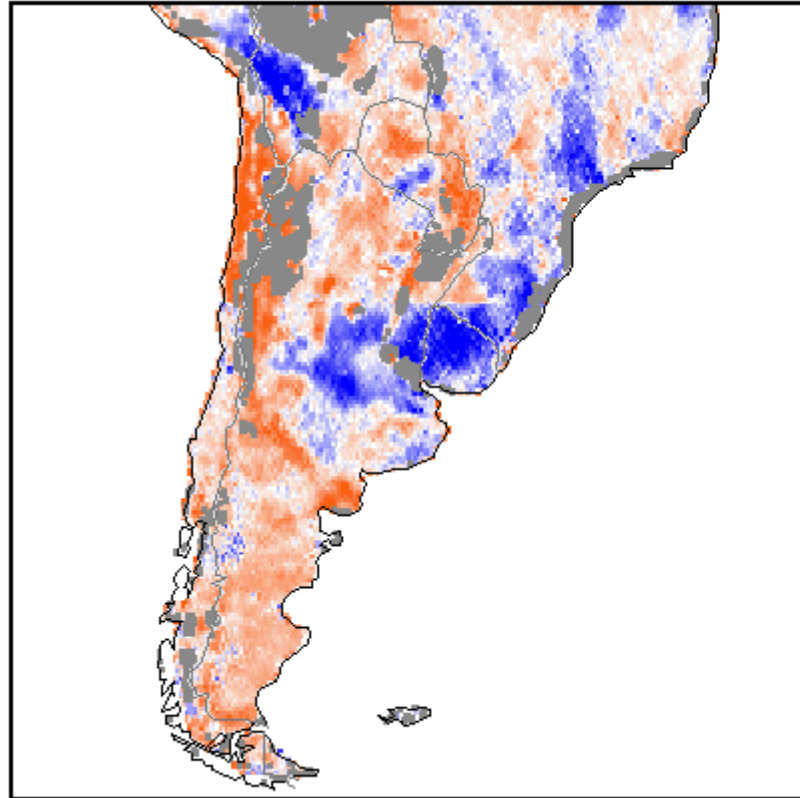
Instruments on the same platform...

MetOp-A 05/08/2007 101003-115017 UTC





Day-2 activities: New agreed products



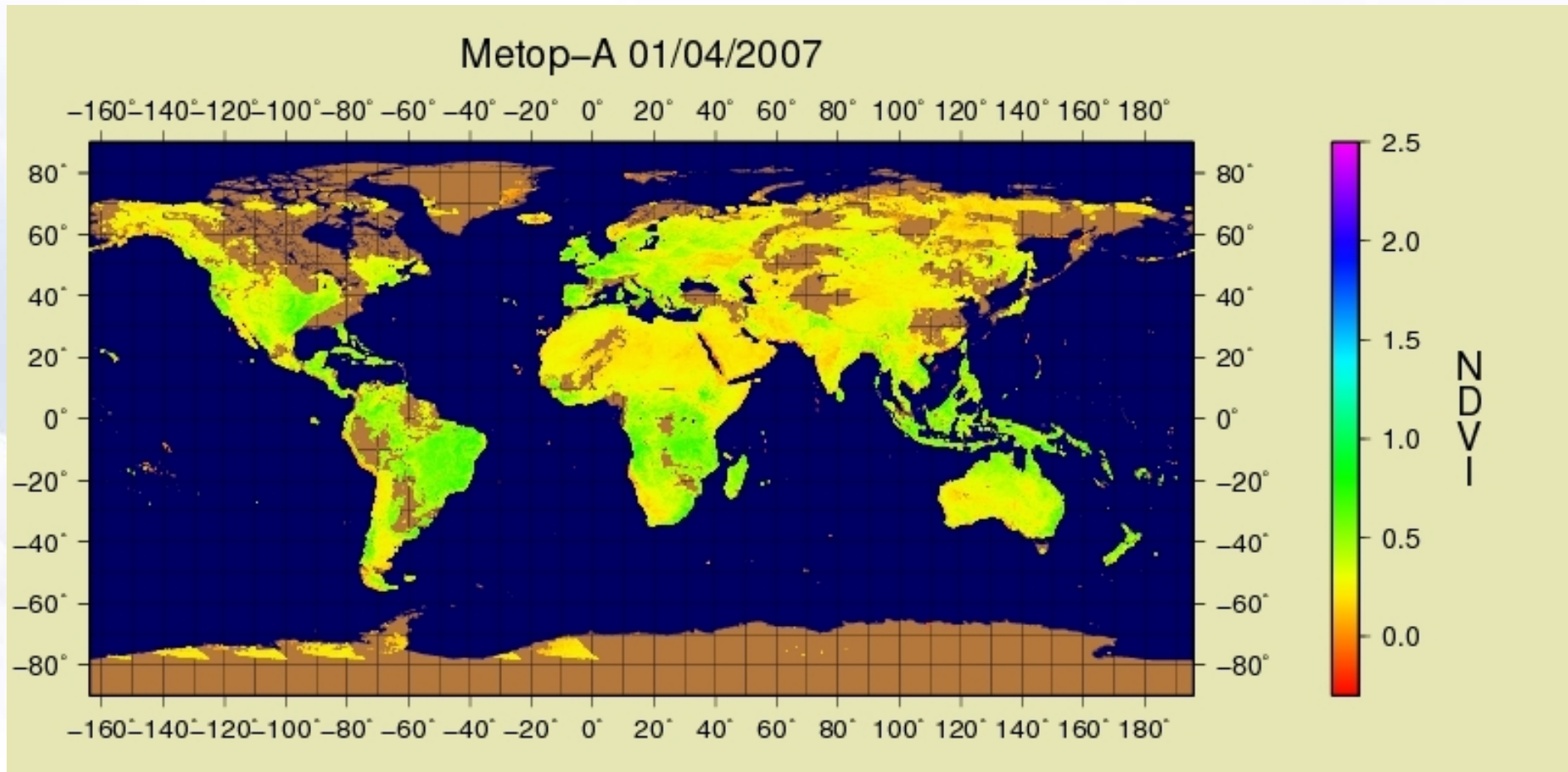
Soil moisture from ASCAT

Wagner et al., 2007



Day-2 activities: New agreed products

NDVI at full resolution from AVHRR





Day-2 activities: Intra calibration

IASI and HIRS

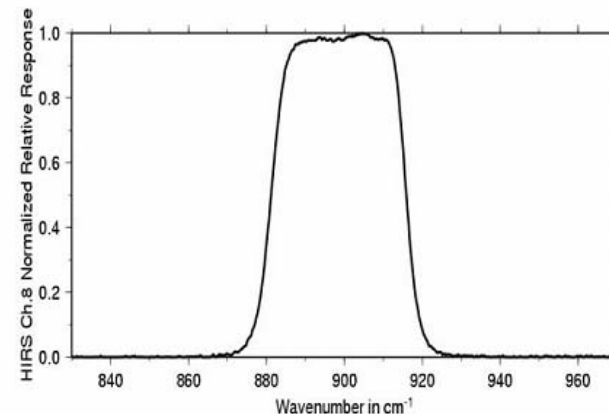
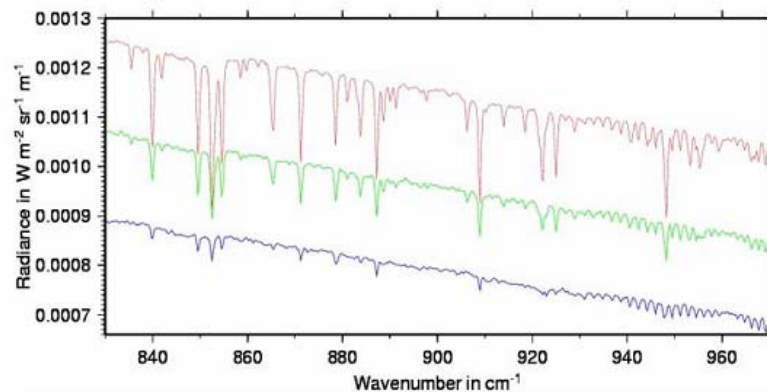
IASI Radiances

+

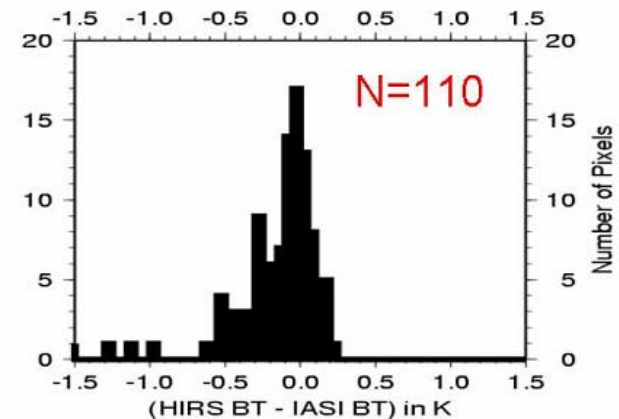
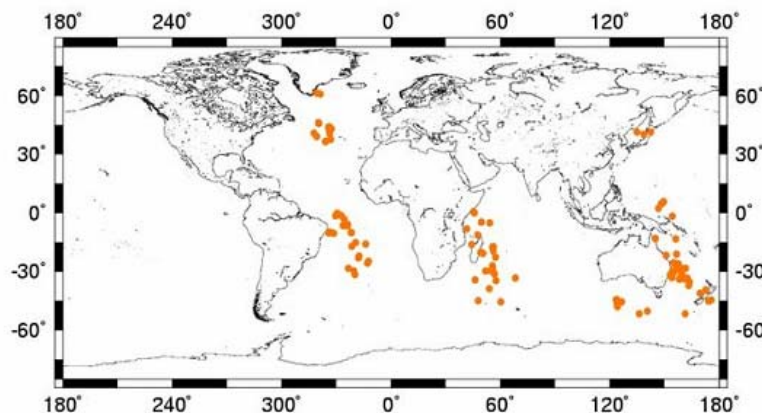
HIRS Ch8 Response

=

Simulated
HIRS
Radiance



Co-Location better than 10 km



Ackermann et al., 2007



Thank you for your attention!

