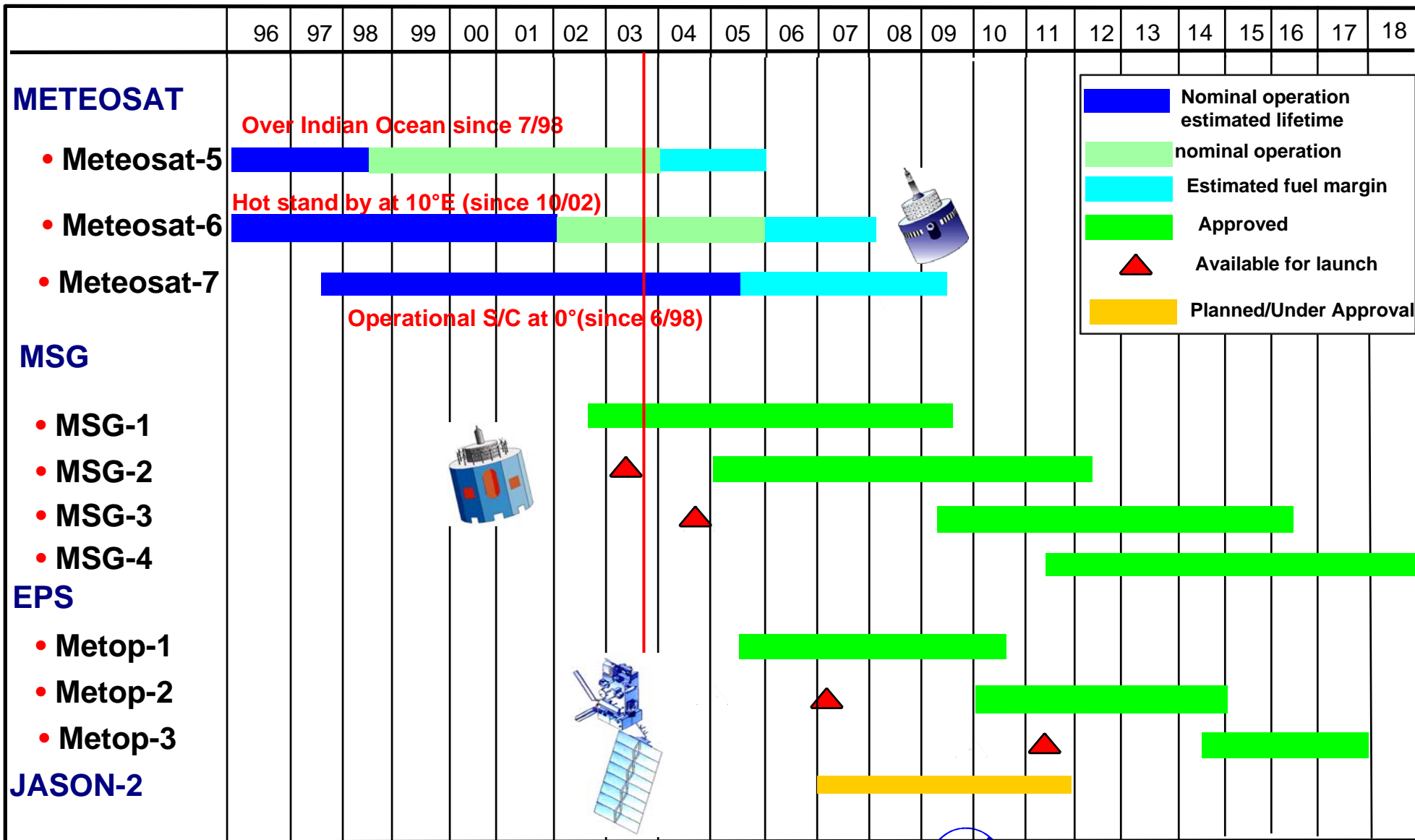


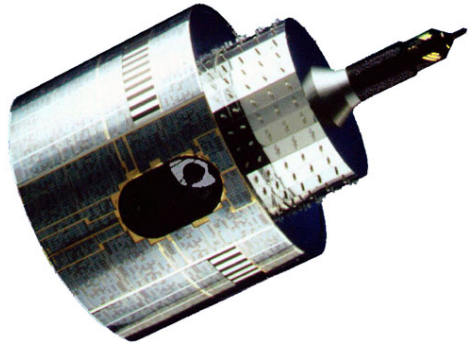
# EUMETSAT PLANS

*Dr. K. Dieter Klaes  
EUMETSAT  
Am Kavalleriesand 31  
D-64295 Darmstadt  
Germany*

# EUMETSAT SATELLITE PROGRAMMES



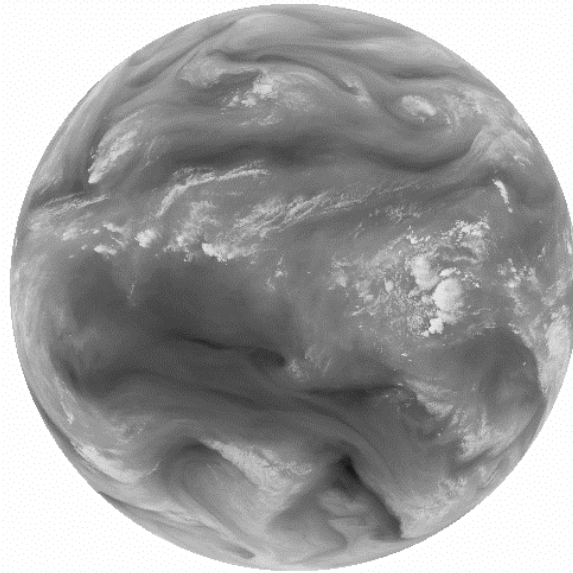
# METEOSAT



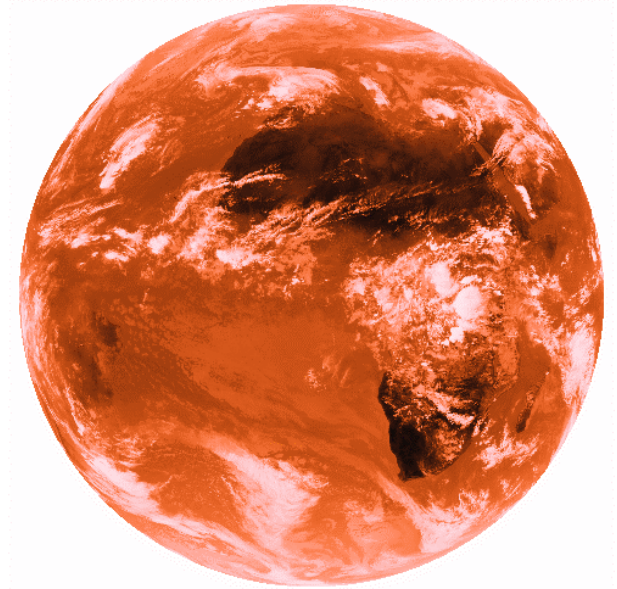
## Meteosat Operational Programme (MOP) and Meteosat Transition Programme (MTP)



Visible (VIS)  
0.4 - 1.0  $\mu\text{m}$   
5000 x 5000



Infrared (IR)  
10.5 - 12.5  $\mu\text{m}$   
2500 x 2500



Water Vapour (WV)  
5.7 - 7.1  $\mu\text{m}$   
2500 x 2500

# Meteosat Meteorological Products

Operational products available in near real-time

- **Clear Sky Radiances**
- **Clear Sky Water Vapour Winds**
- **Climate Data Set**
- **Cloud Analysis**
- **Cloud Motion Winds**
- **Cloud Top Height**
- **High Resolution Visible Winds**
- **Sea Surface Temperatures**
- **Upper Tropospheric Humidity**

All of the above products are generated between 1 and 48 times each day on an operational basis. The Climate Data Set is stored for research use. The other products are distributed to users immediately after processing.

# Meteosat Climate Products

## The ISCCP & GPCP

- **International Satellite Cloud Climatology Project**
  - Clouds described by 80 parameters
  - Every 3 hours, in 2.5° latitude/longitude intervals
  - Global record since 1983
- **Global Precipitation Climatology Project**
  - Estimates of monthly precipitation totals
  - In 1° latitude/longitude intervals
  - Global record since 1986

# EUMETSAT Indian Ocean Data Coverage (IODC)



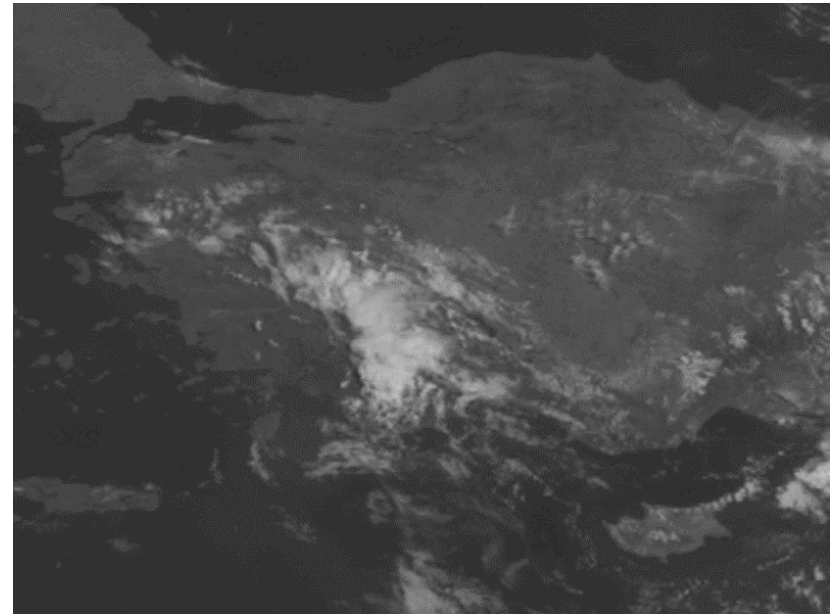
From end of May 1998 Meteosat-5 has been located at 63°E where it supported INDOEX until the end of 1999 and will continue as IODC until at least the end of 2005



# EUMETSAT

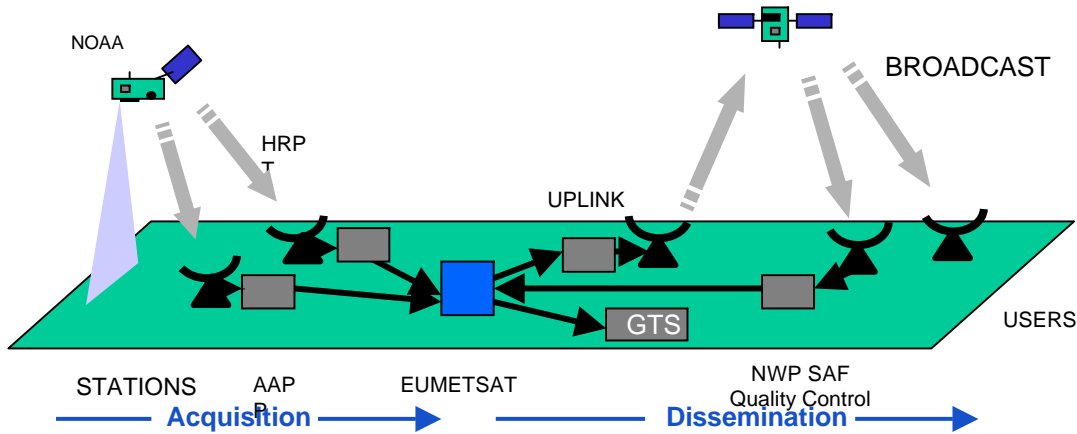
## Rapid Scanning Service (RSS)

- Resulting from a request to support the Mesoscale Alpine Project (MAP) in September 1999 the backup spacecraft Meteosat-6 was configured to conduct a series of rapid scan operations
- Initially the rapid scan area covered the Alpine region at 5 minute intervals

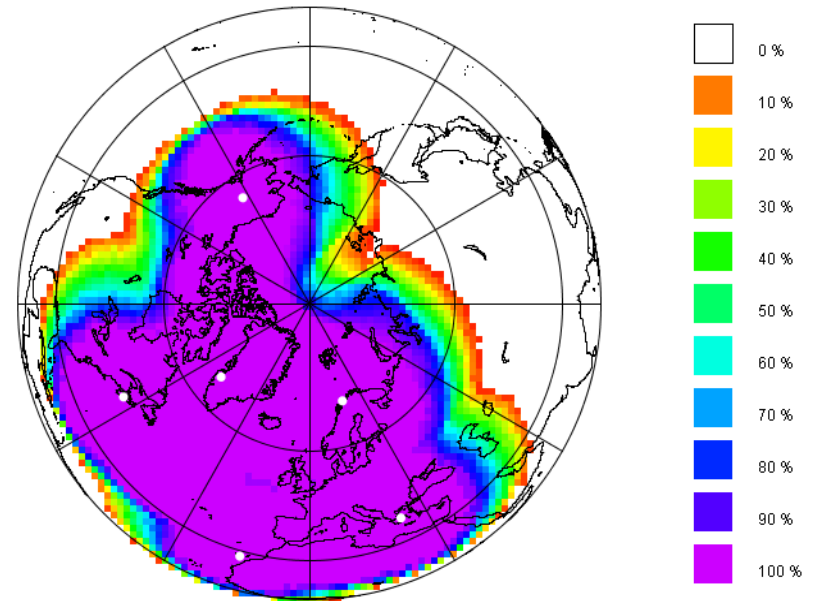


⇒ In 2000 the scanned area was increased significantly and the repeat cycle fixed to 10 minute intervals. From mid 2001 the Rapid Scanning Service became operational

# EUMETSAT ATOVS Retransmission Service (EARS)



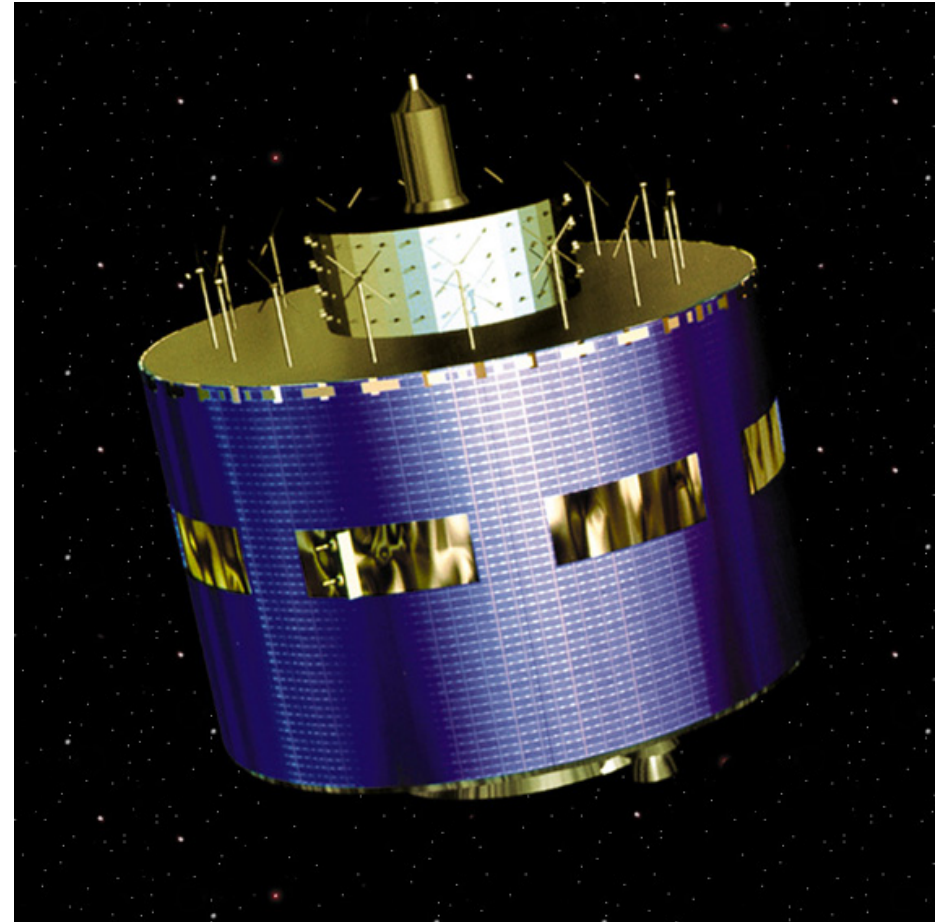
**Demonstrates potential future dissemination concepts to meet shorter timeliness requirements**



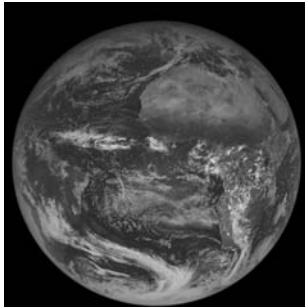


# METEOSAT SECOND GENERATION - MSG

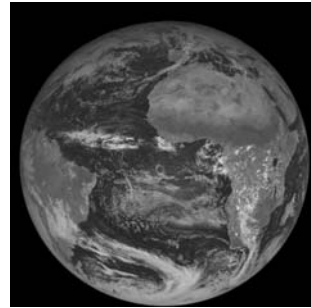
- Launched 2002
- Currently under commissioning
- Operations planned from 2004



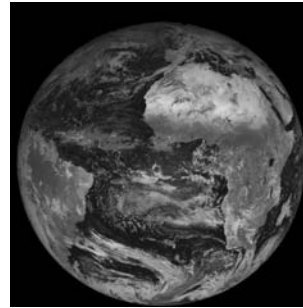
# MSG capabilities



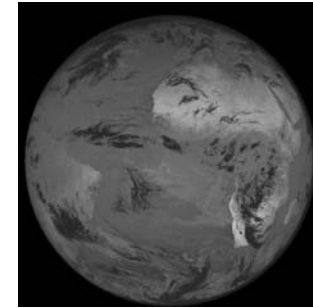
VIS 0.6  $\mu\text{m}$



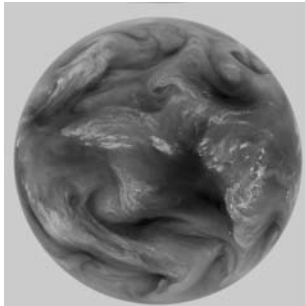
VIS 0.8  $\mu\text{m}$



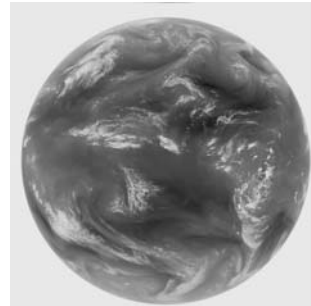
NIR 1.6  $\mu\text{m}$



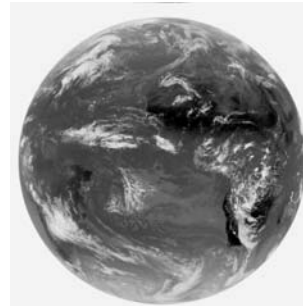
NIR 3.9  $\mu\text{m}$



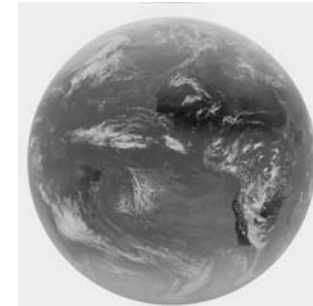
WV 6.2  $\mu\text{m}$



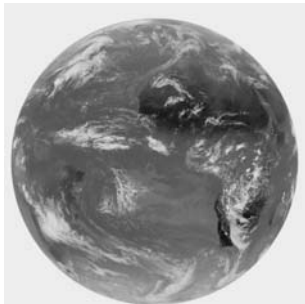
WV 7.3  $\mu\text{m}$



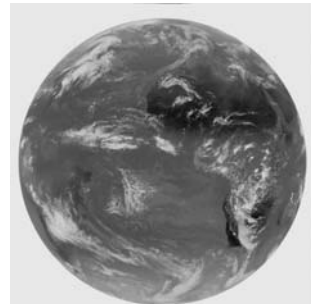
IR 8.7  $\mu\text{m}$



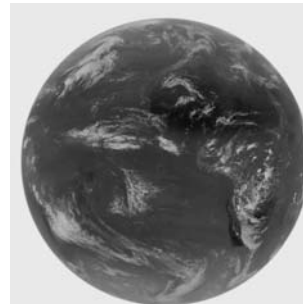
IR 9.7  $\mu\text{m}$



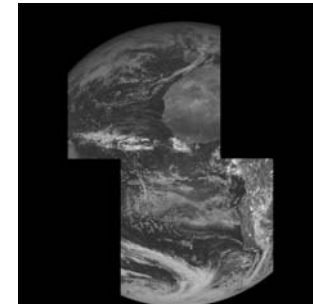
IR 10.8  $\mu\text{m}$



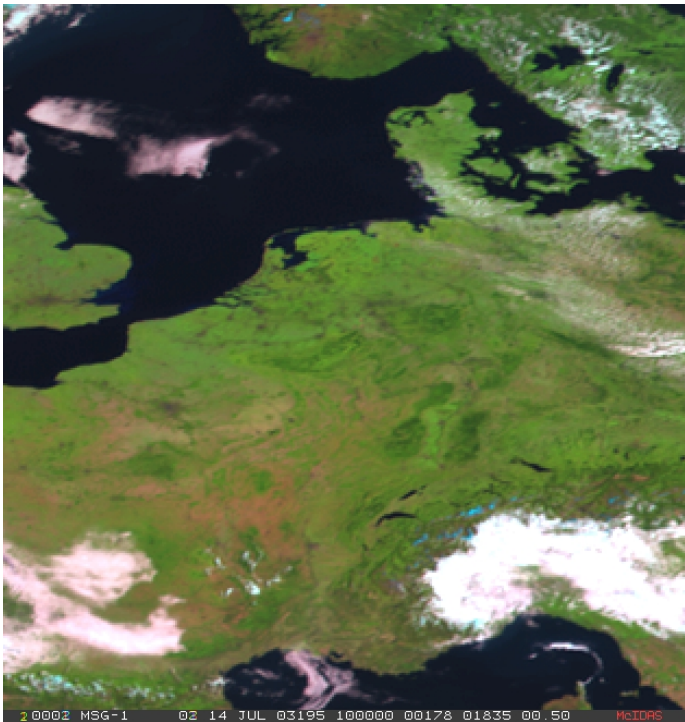
IR 12.0  $\mu\text{m}$



IR 13.4  $\mu\text{m}$



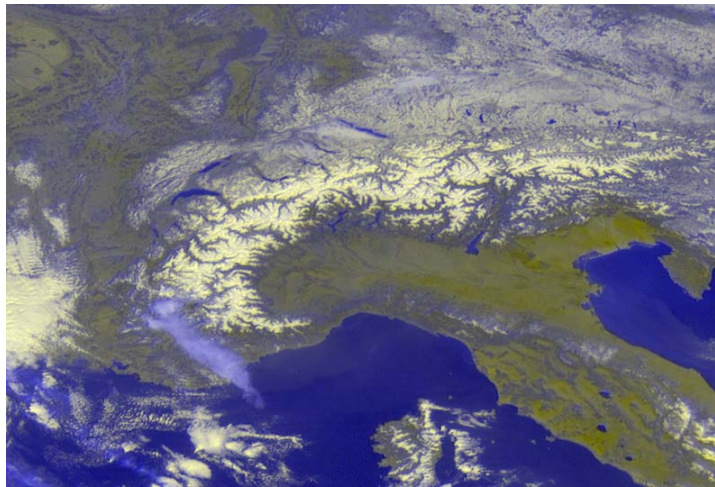
HRVIS



MSG-1  
14 July 2003  
10:00 UTC

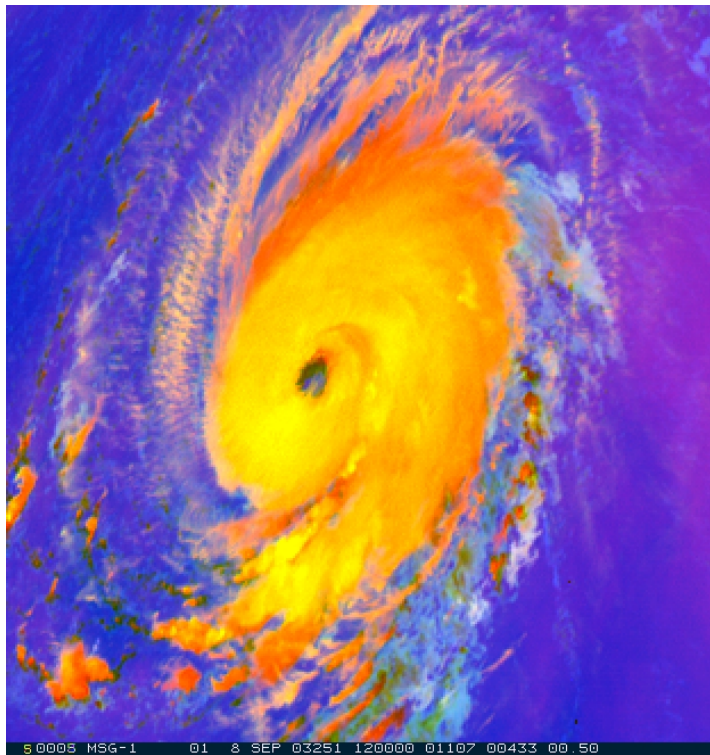
Details of vegetation in Europe – grassland shows up as bright green areas, the forests are dark green. Also noteworthy is the dense fog over the Po area and the poor snow cover over the Central Alps (small cyan-colored areas).

Composite image using NIR 1.6, VIS 0.8 and VIS 0.6



MSG-1, 14 July 2003, 10:00 UTC

Snow over the Alps, displaying the Alpine valleys in beautiful clarity. Composite image using the high resolution visible channel (HRVIS) and IR 10.8



MSG-1  
8 September 2003  
12:00 UTC

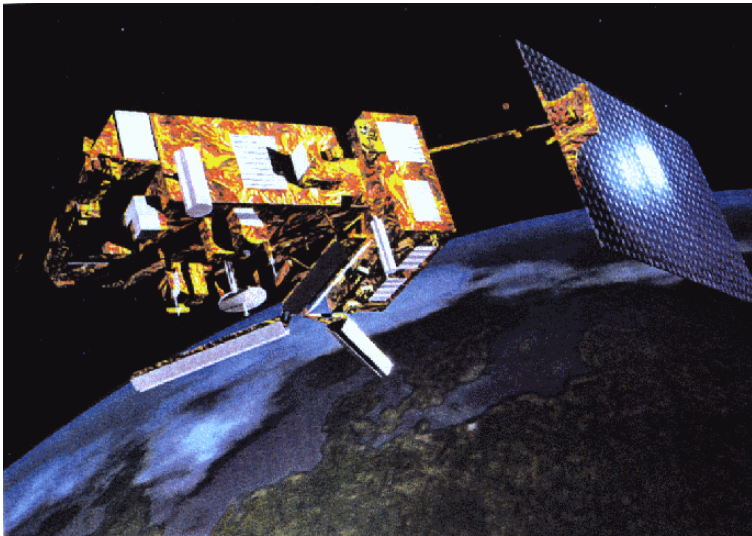
Hurricane "Isabel" over the Atlantic.

Composite image produced from channels VIS0.6, NIR1.6, IR3.9, WV6.2, WV7.3 and IR10.8

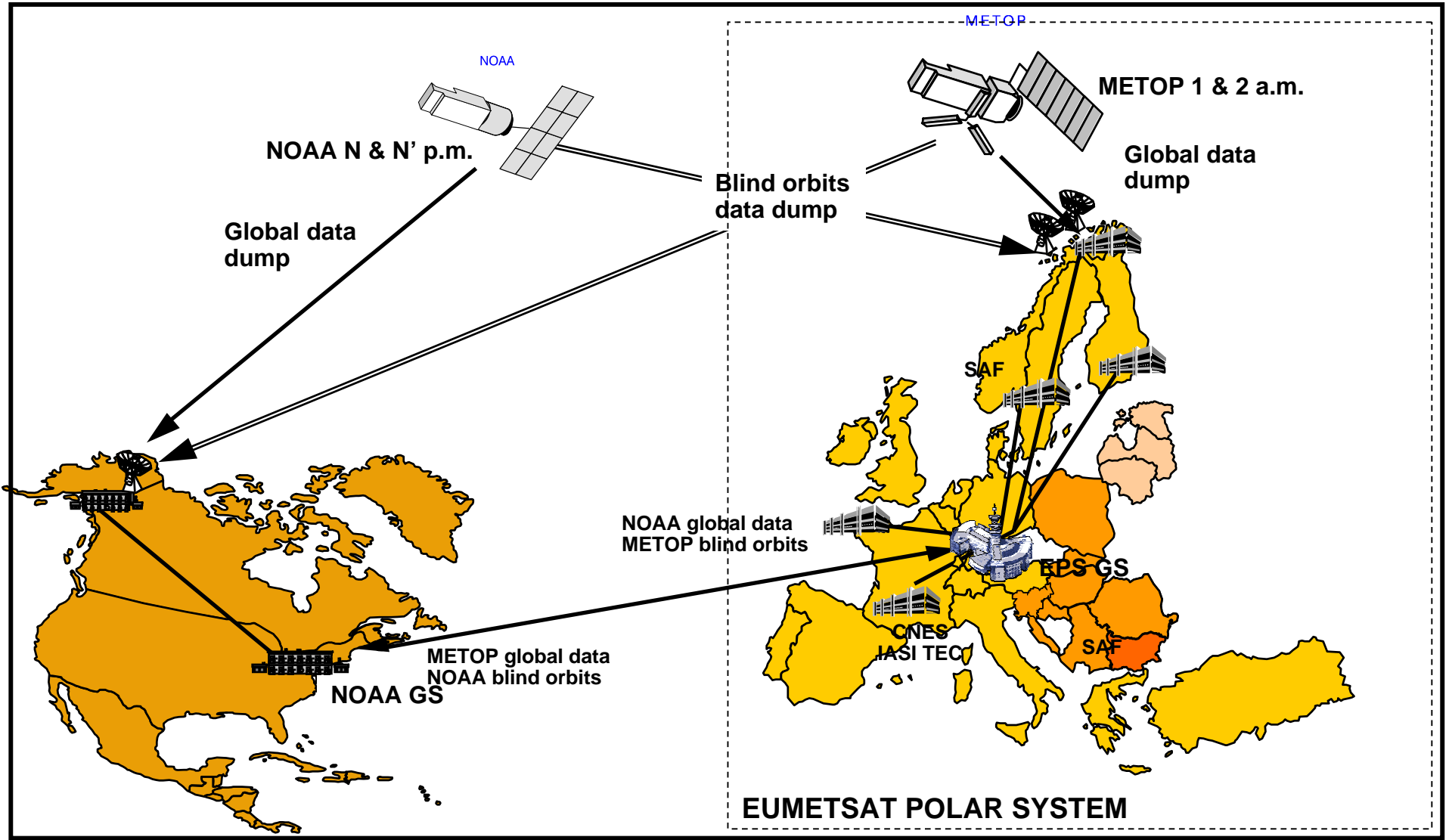


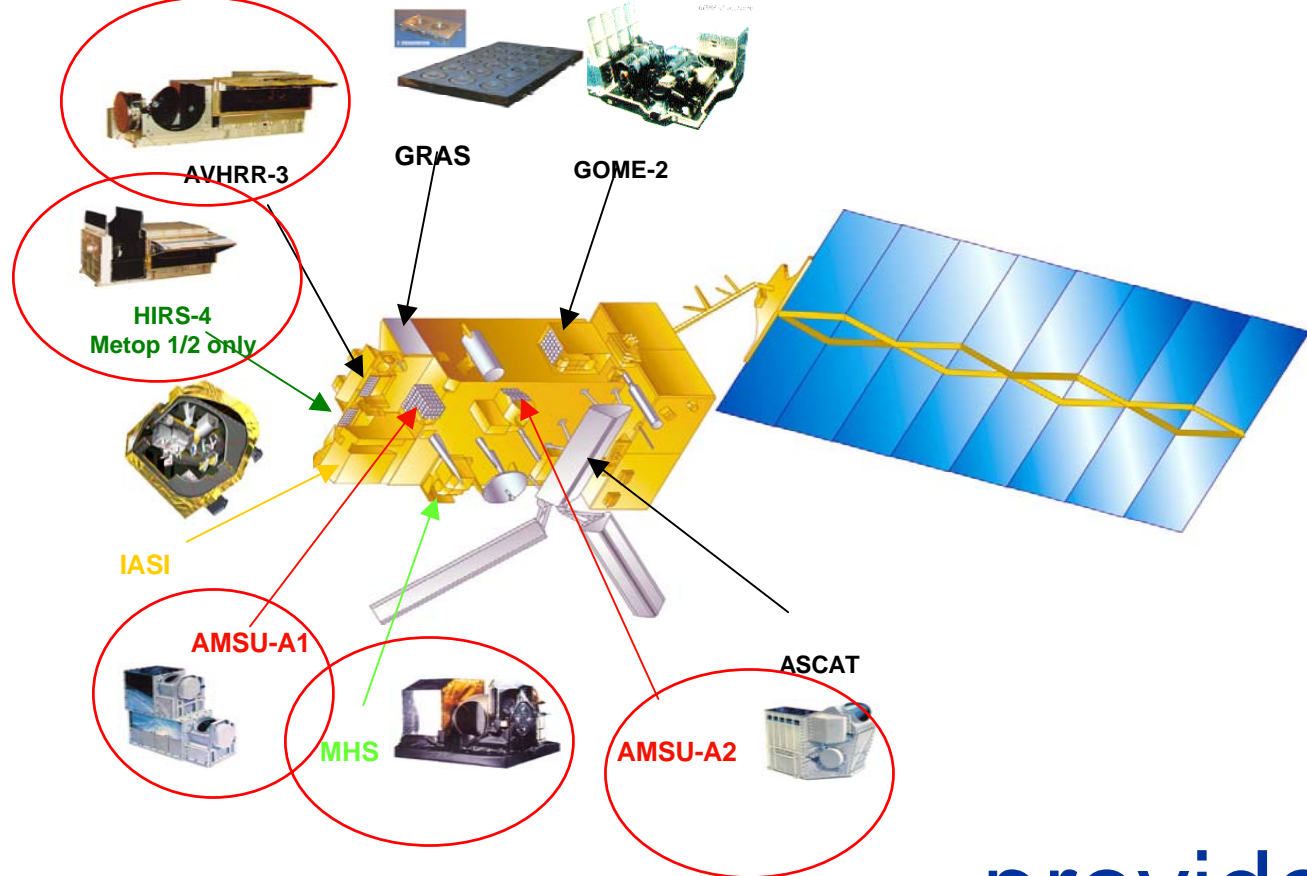
# EUMETSAT POLAR SYSTEM

- Scheduled launch Oct 2005
- 14 years of operation



# EPS in the IJPS





# ATOVS and AVHRR

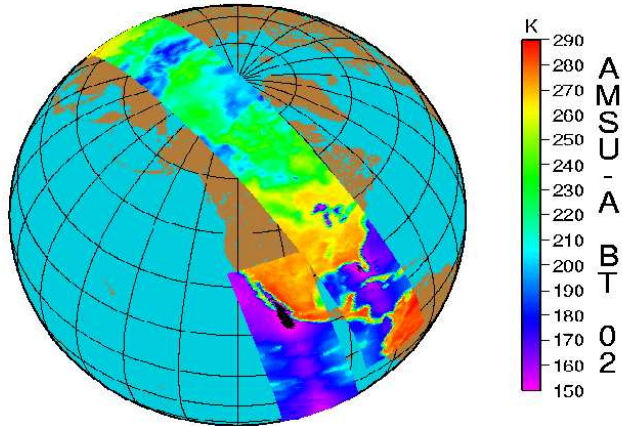
provide  
continuity to current system

# EPS provides GLOBAL products

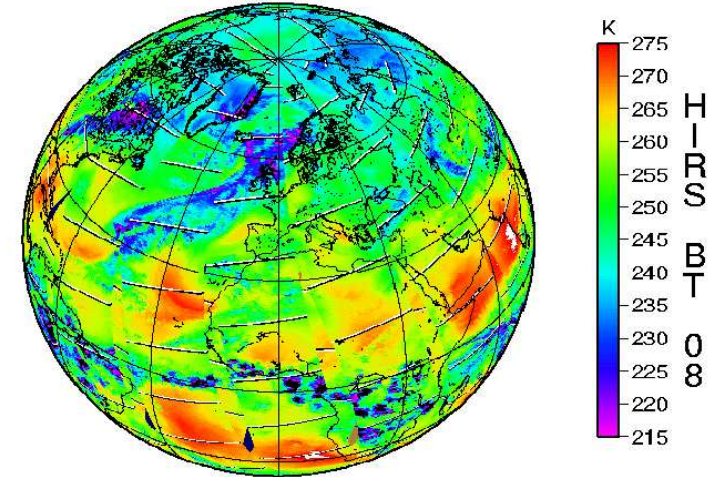
NOAA15 26/02/2000

AAPP V1.3 (08.1999)

NOAA15 1999 89 0:37:31 - 2:31:33



## Composite of 14 level products of one day from HIRS



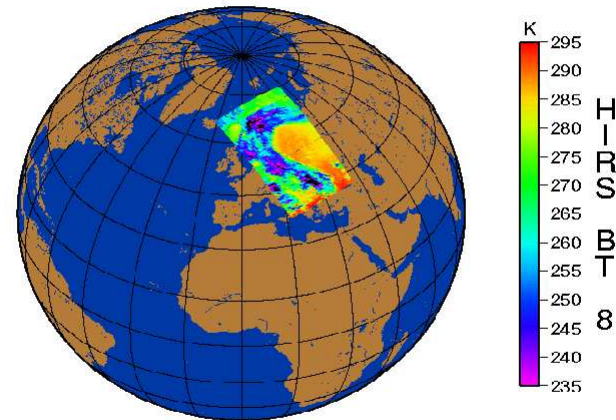
GMT Feb 27 18:30:51 2000 © KDK 01.2000

AAP GMT Aug 27 19:08:18 2000 © KDK 02.2000

NOAA15 199825617: 6: 3 - 17:15:26

Global Products are dump-based

## EPS provides local AHRPT/LRPT service

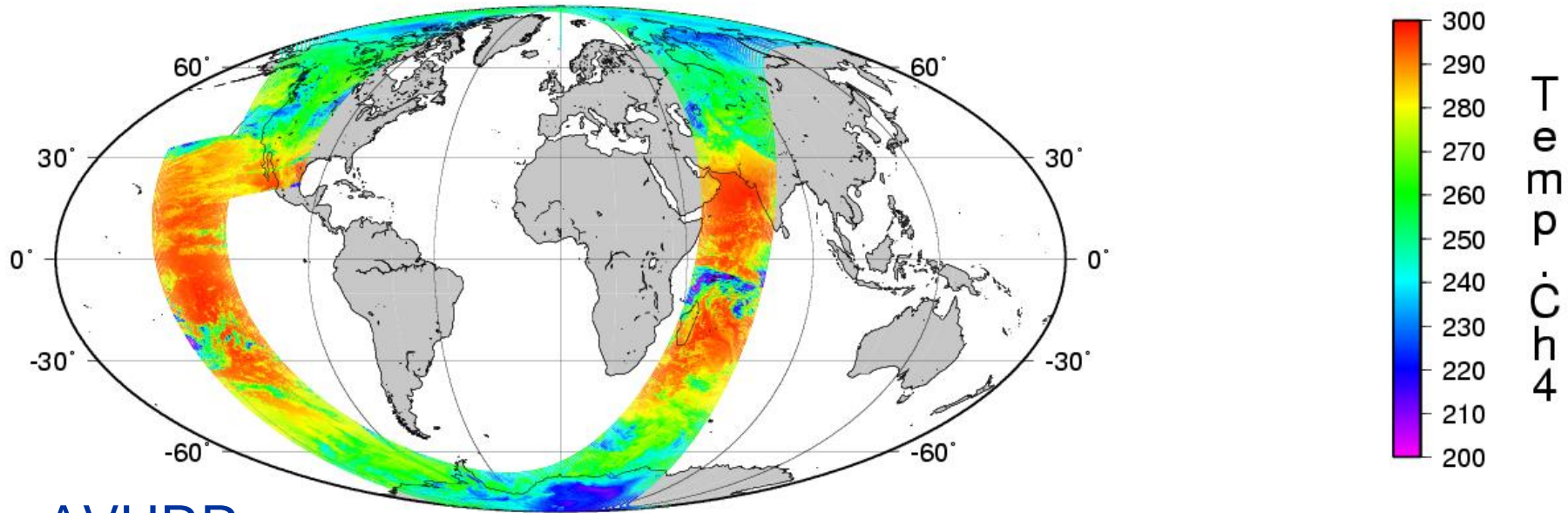


GMT Feb 27 13.12.04 2000 © KDK 02.2000

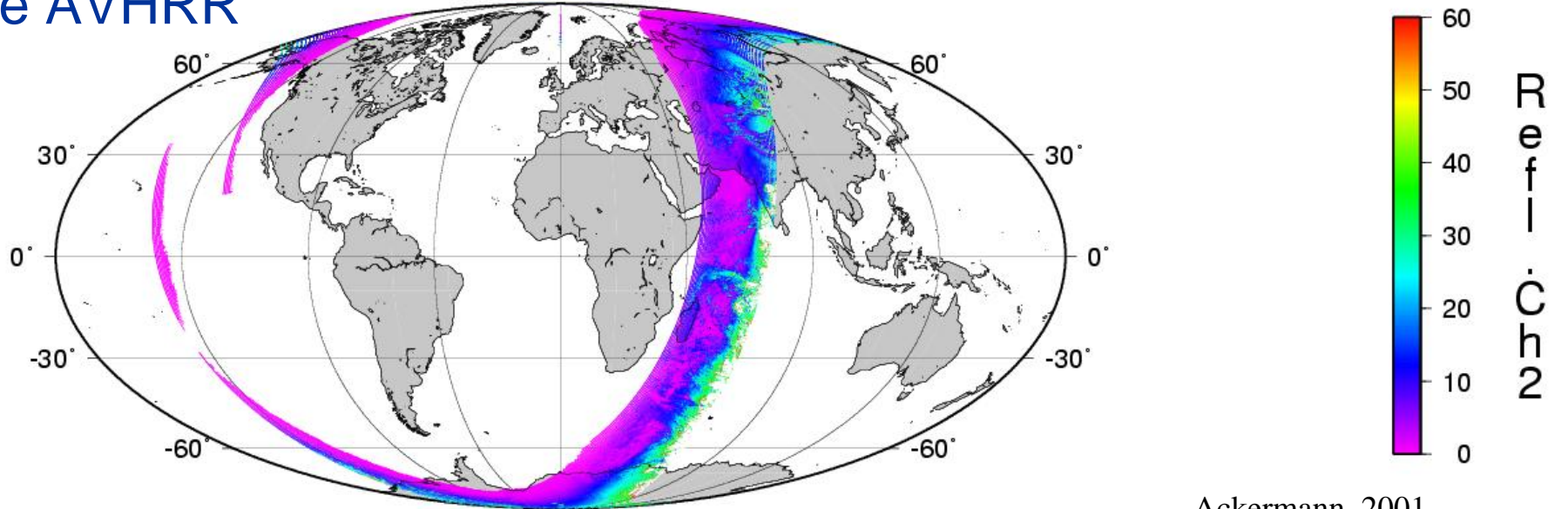




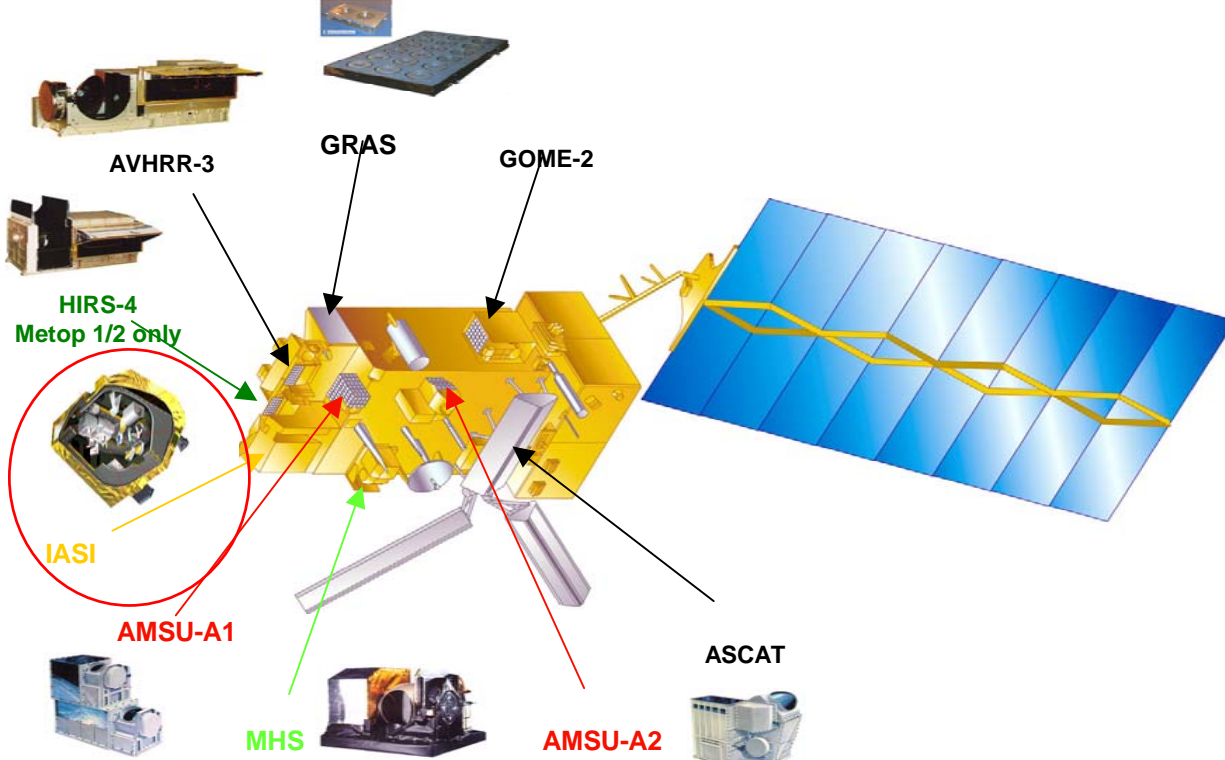
# EPS provides continuity to the current polar system:



## Example AVHRR



Ackermann, 2001



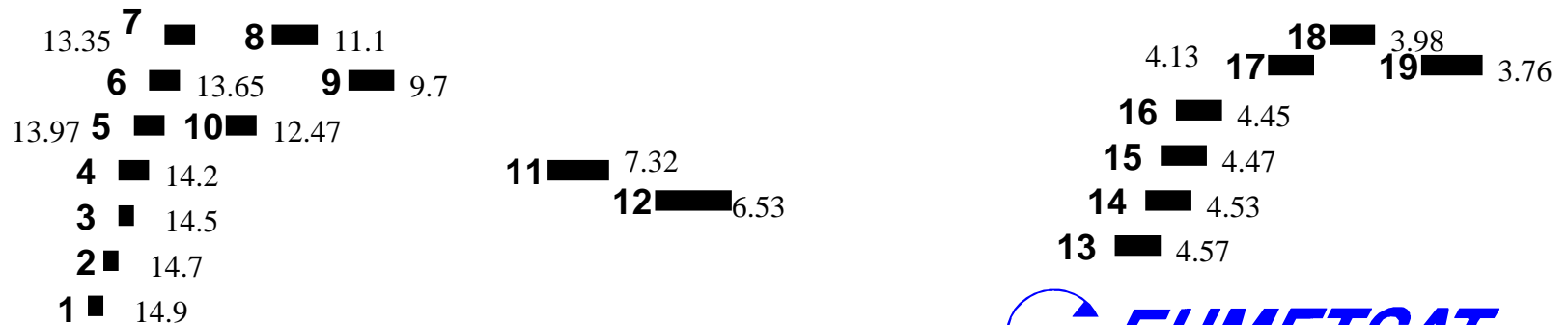
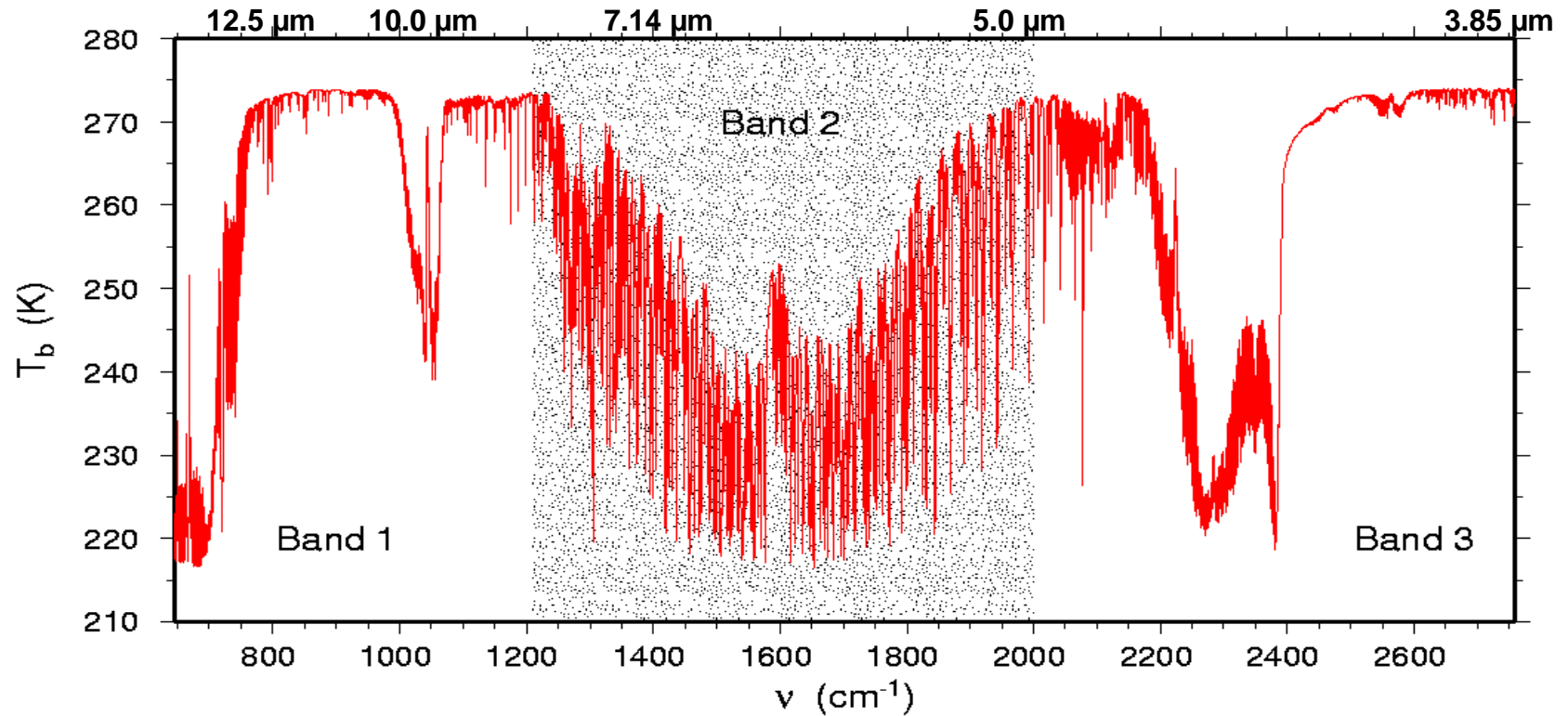
# IASI

## New Technology provides enhanced capabilities for Infrared Sounding

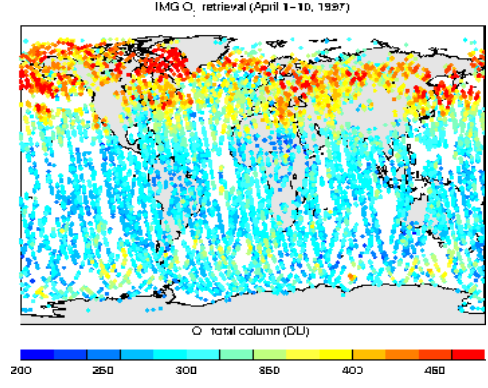
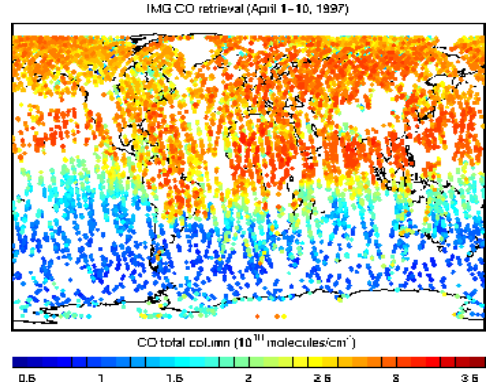
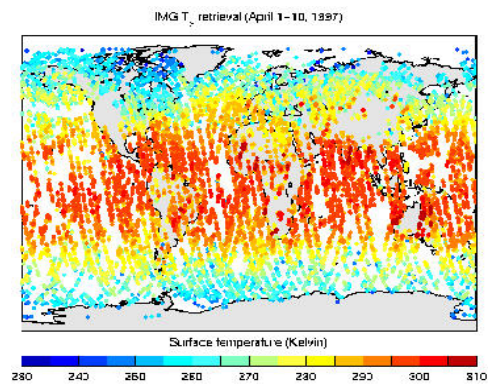
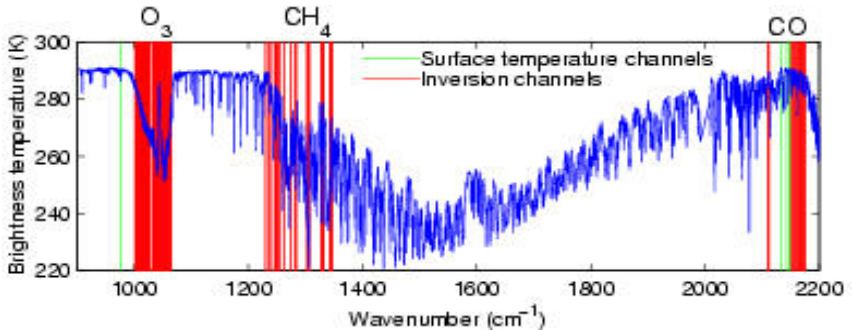


# HIRS/4 IR Channels

## IASI Bands



# Potential for Trace Gas Retrieval

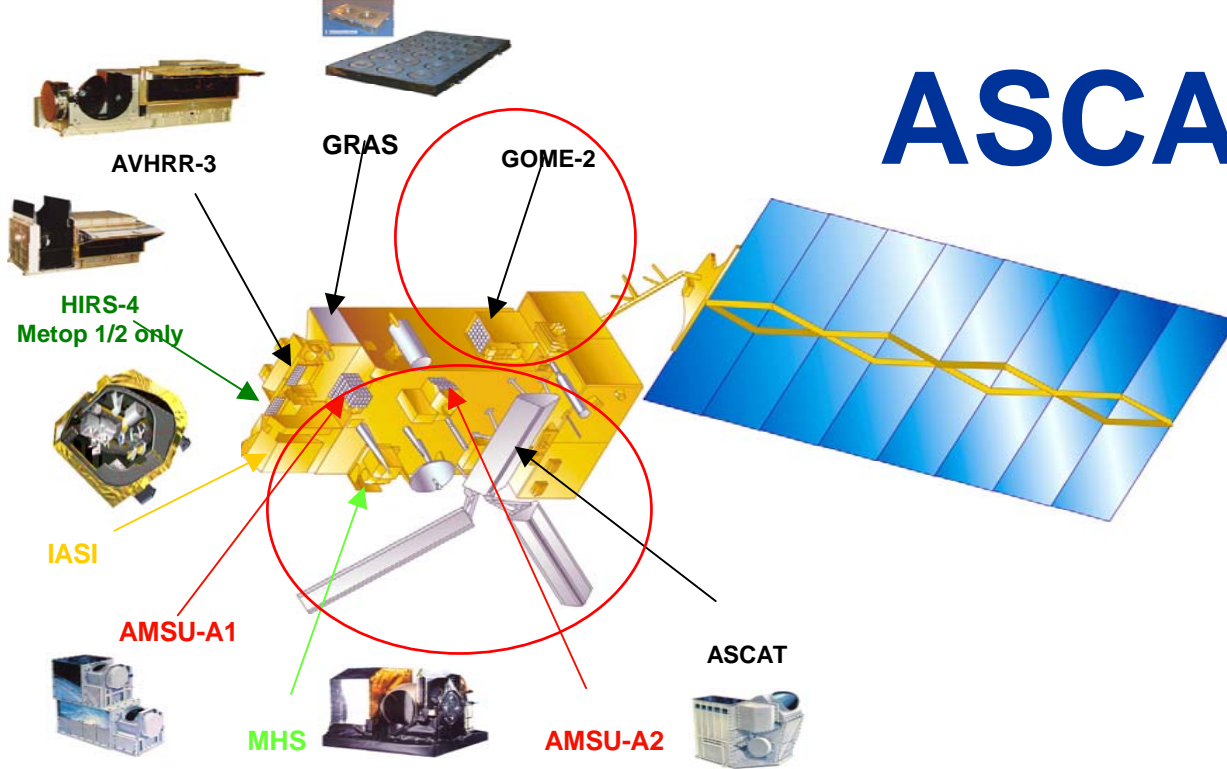


Clerbaux et al., 2003

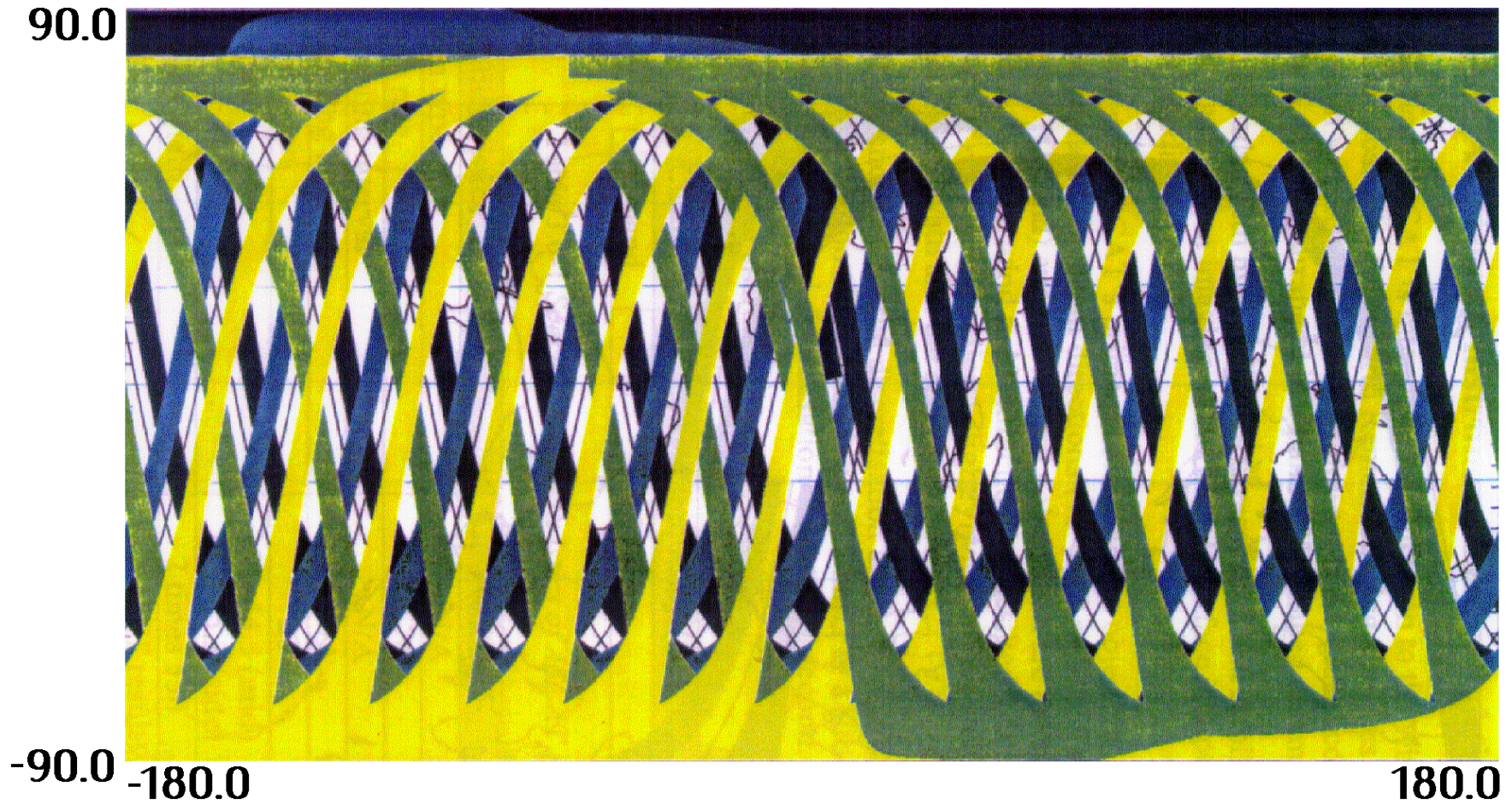




# ASCAT and GOME



## Proven Research Instruments become operational



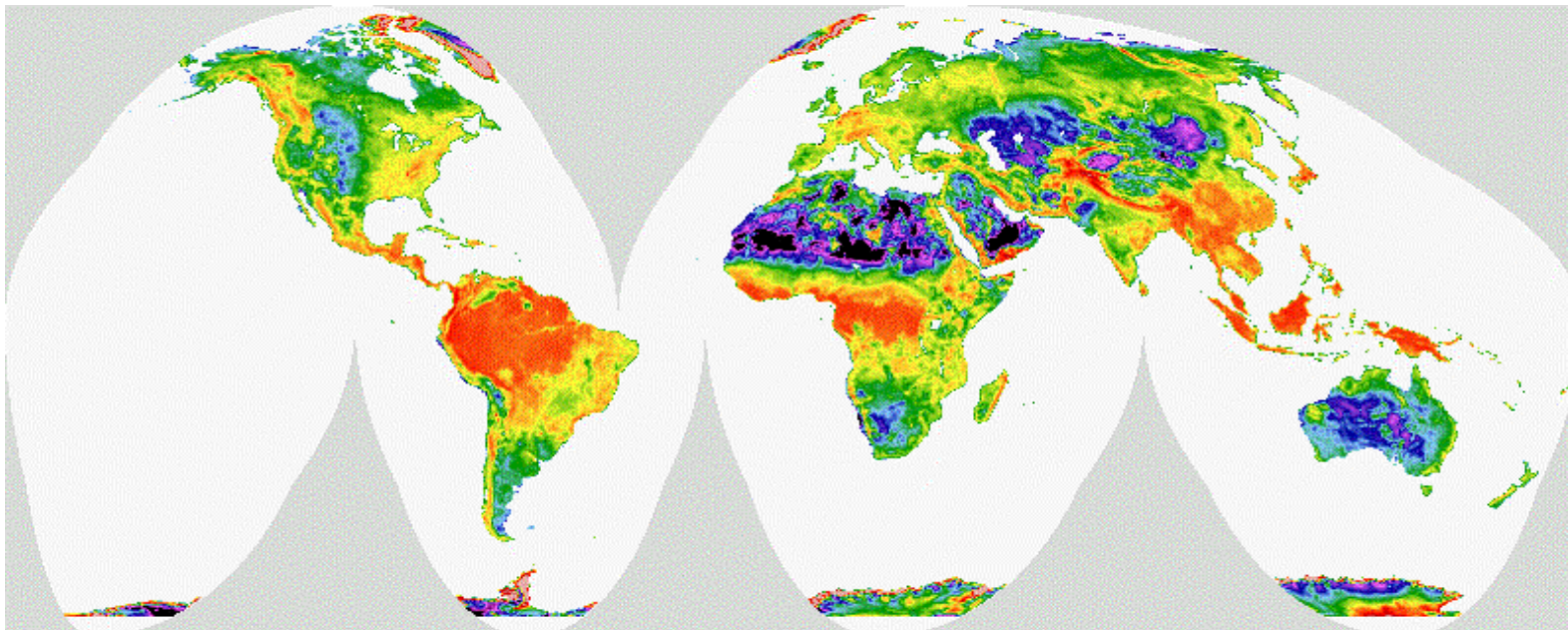
## Improved Earth Coverage with ASCAT during one day





# Potential scatterometer land application: Vegetation and Surface Roughness

- Scale compatible with major vegetation biomes and soil groups (climate-driven)
- Compared to AVHRR and SMM/I, global scatterometer maps exhibit more contrasts (Prigent et al., in press)

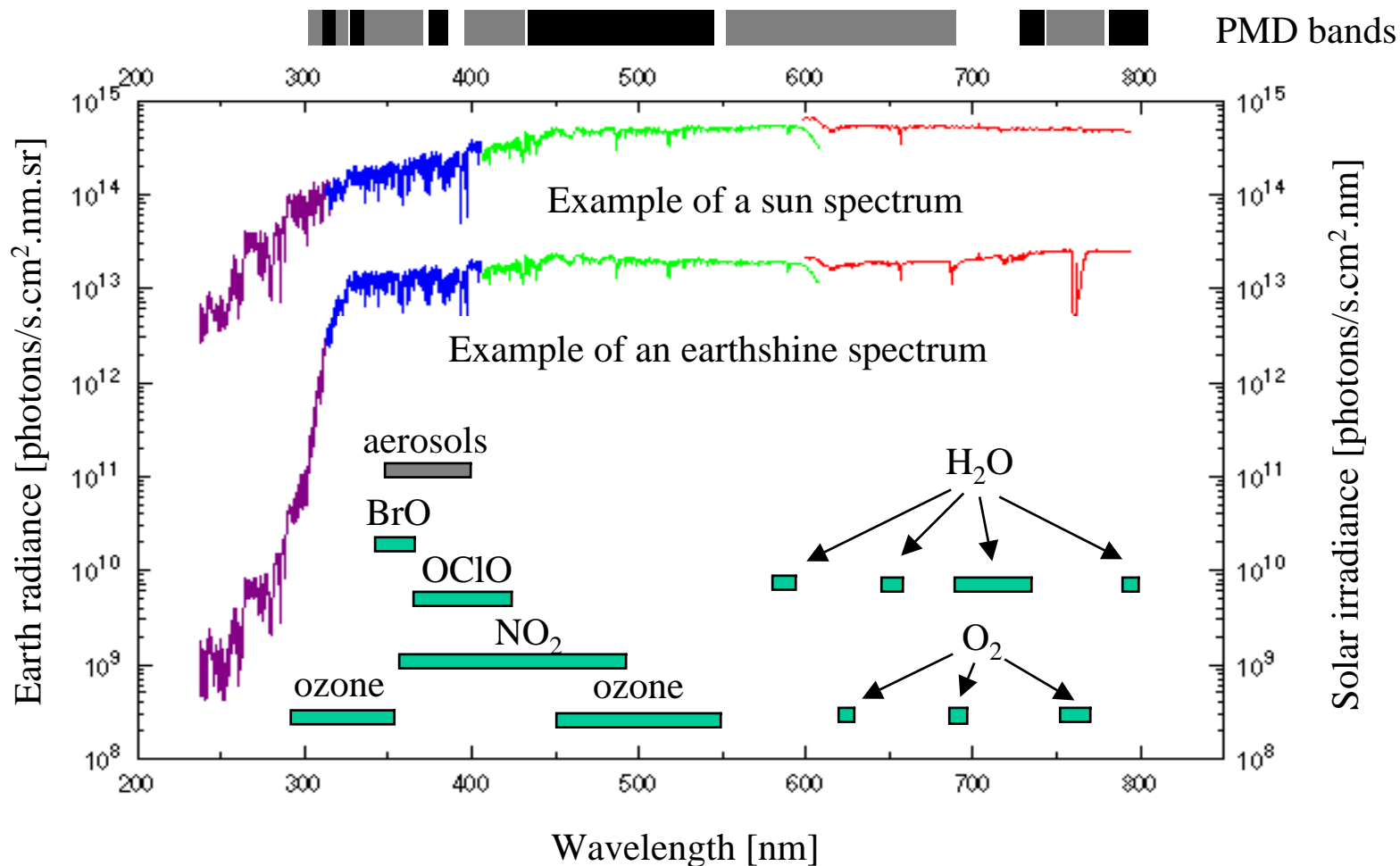


Global backscatter map © IFARS

Wagner, 2001



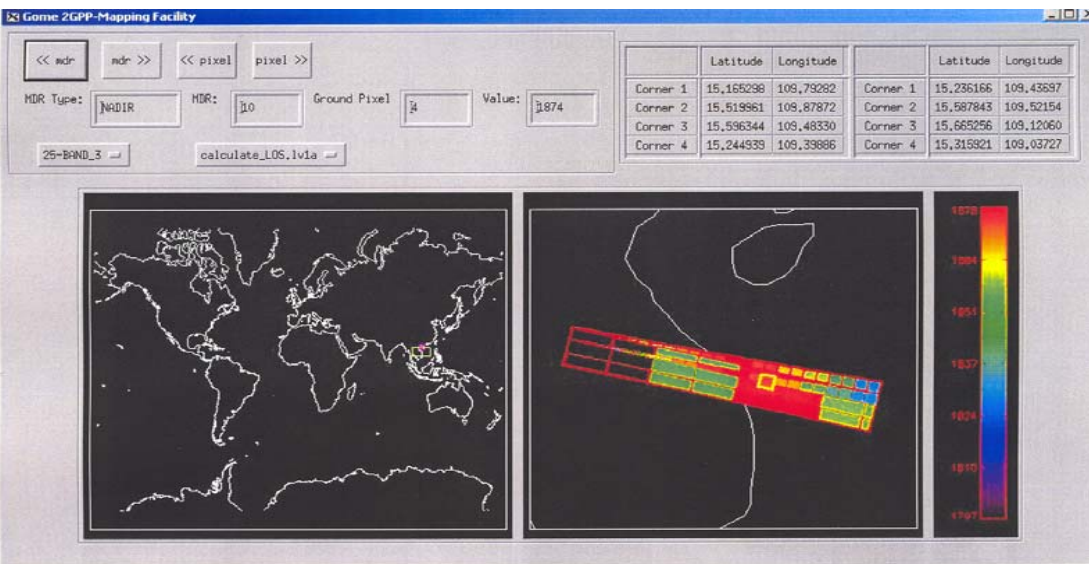
# GOME-2 channels and potential for retrieval of species



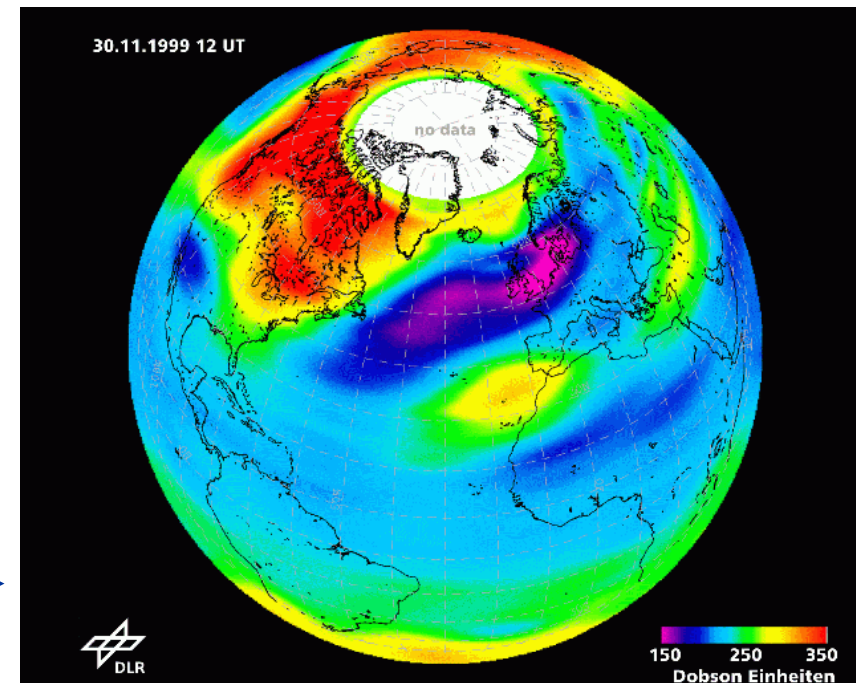
Source: ESA, Callies et al. 2000

# GOME-2 Level 1 Ground Processor Prototype Output

## Example for CGS product (1granule)

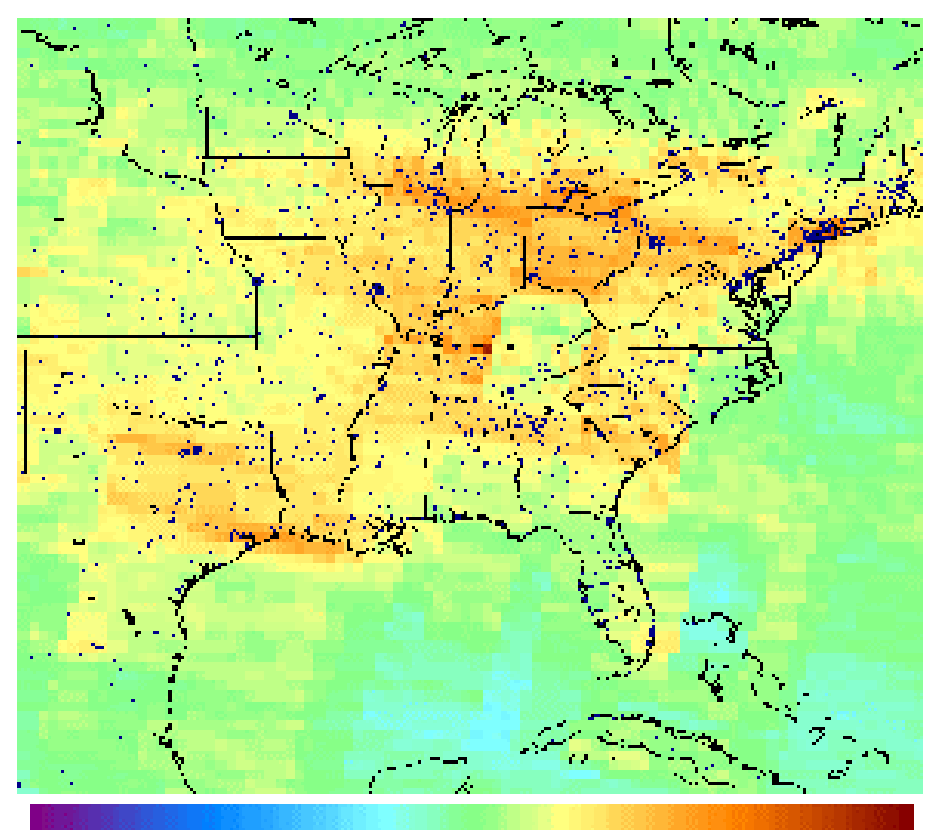
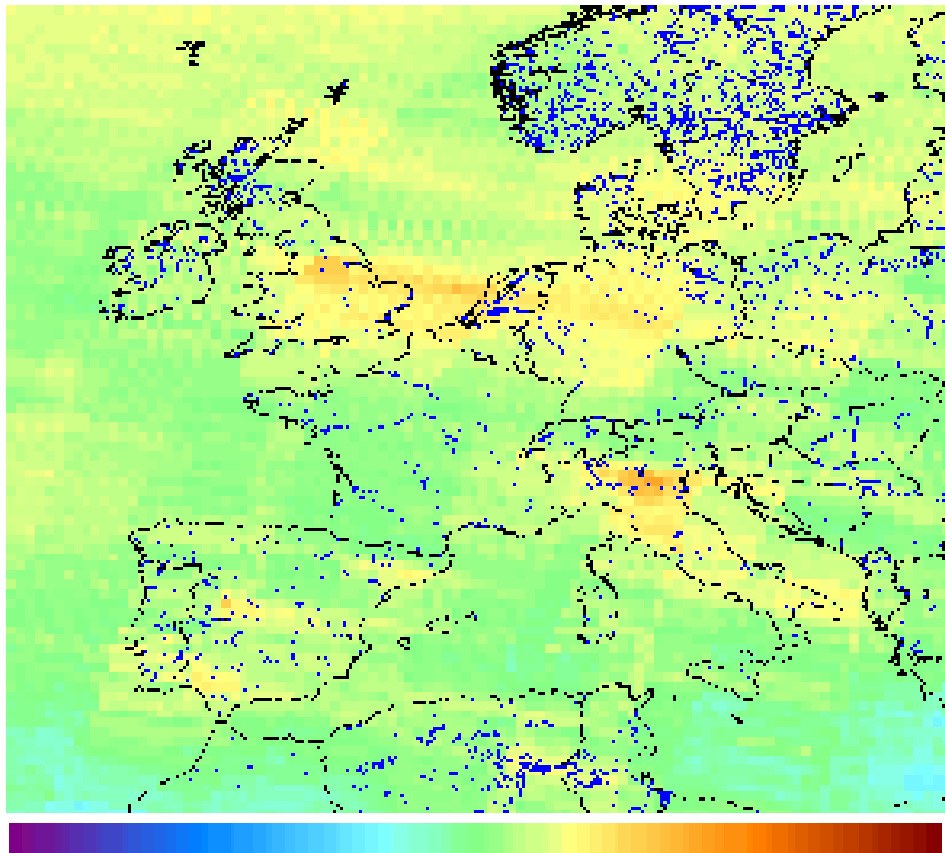


Level 2 and higher products will be generated in the SAF



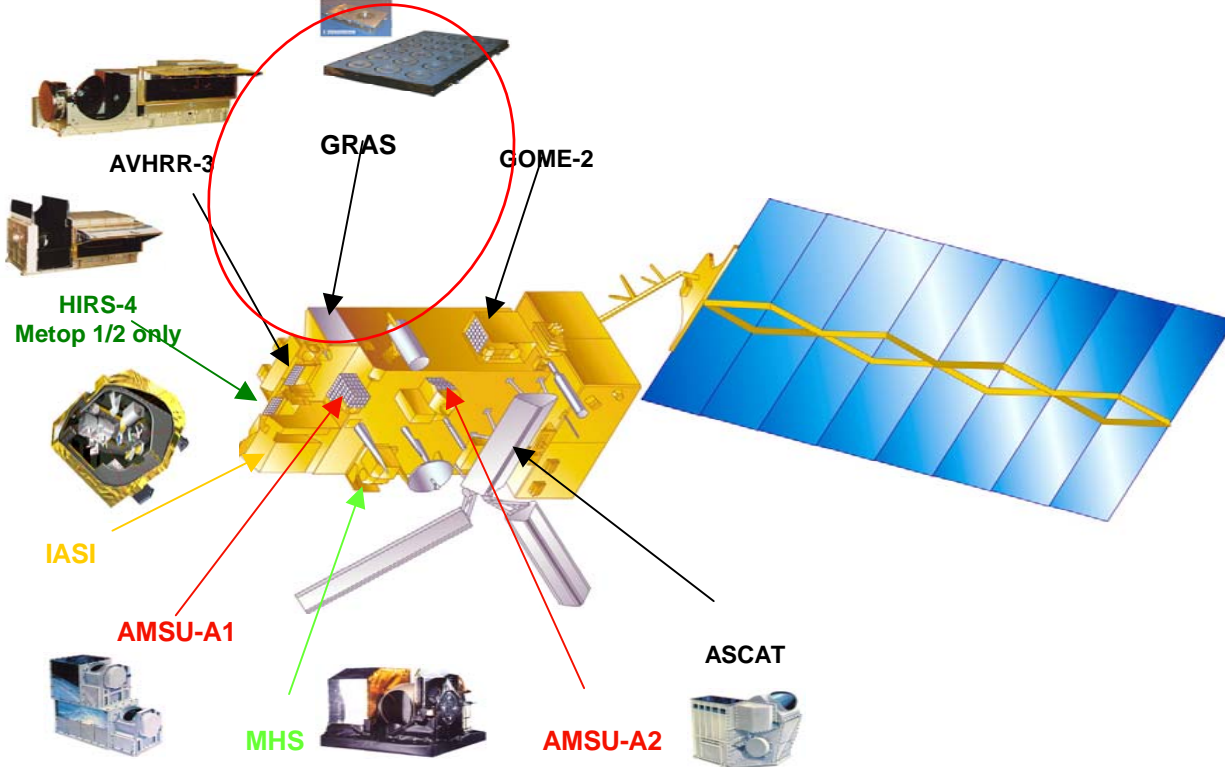
Munro, 2003

GOME/ERS-2 30 November 1999  
 Global ozone total column concentration.  
 Low concentration of ozone over north Atlantic and north Europe due to dynamically induced ozone loss in the lower and middle stratosphere. Source: DLR



**Source: DLR**

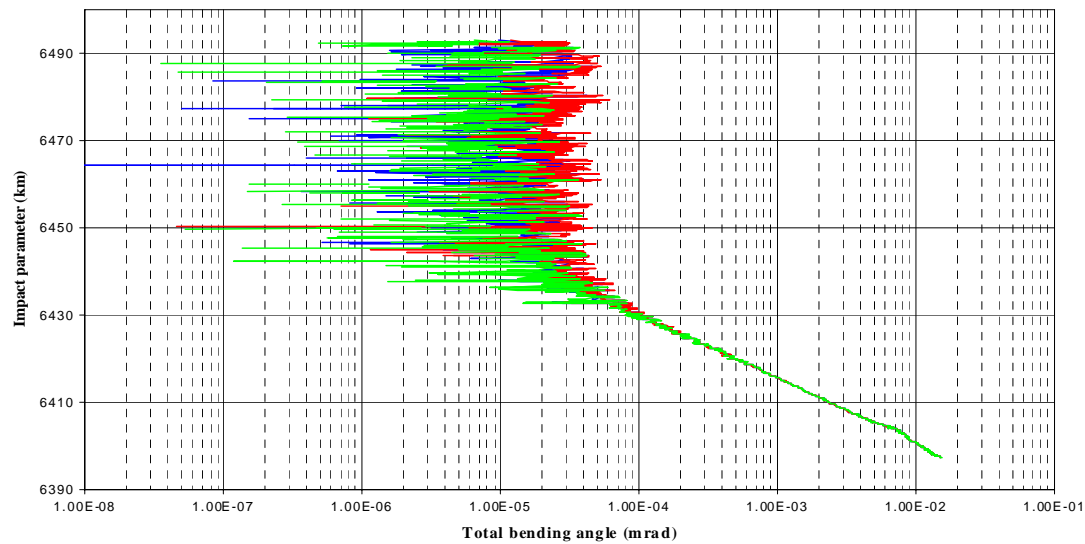
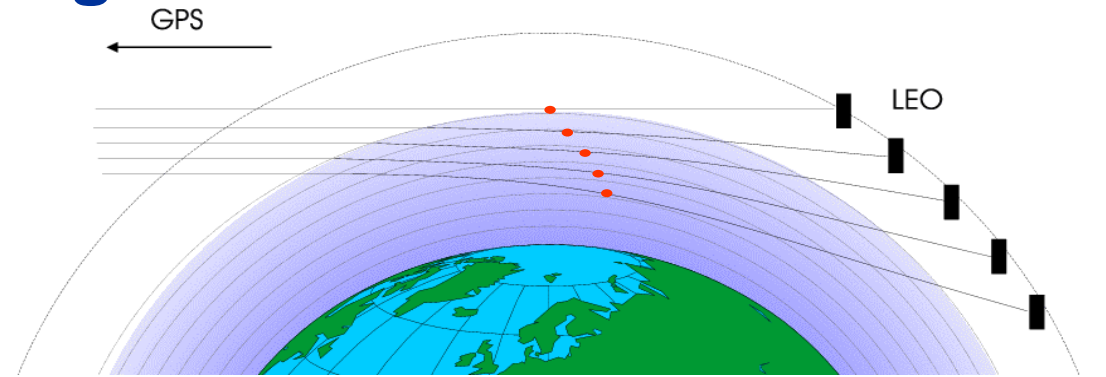
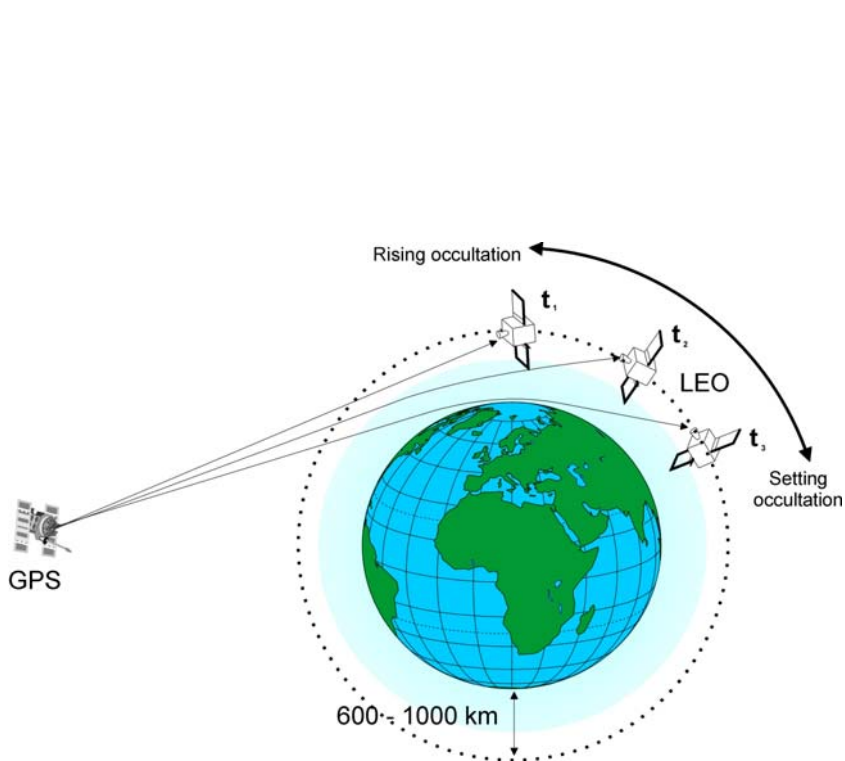
GOME/ERS-2 15-16-17 July 1998: NO<sub>2</sub> total column concentration over Europe (left) and the USA (right): High concentration (orange) over areas with dense population (Po valley, The Netherlands, England, US East coast)



**GRAS**

**First use of Radio Occultation  
technique in operations requires  
development of a whole system**

# GRAS: limb sounding by occultation of GPS signals



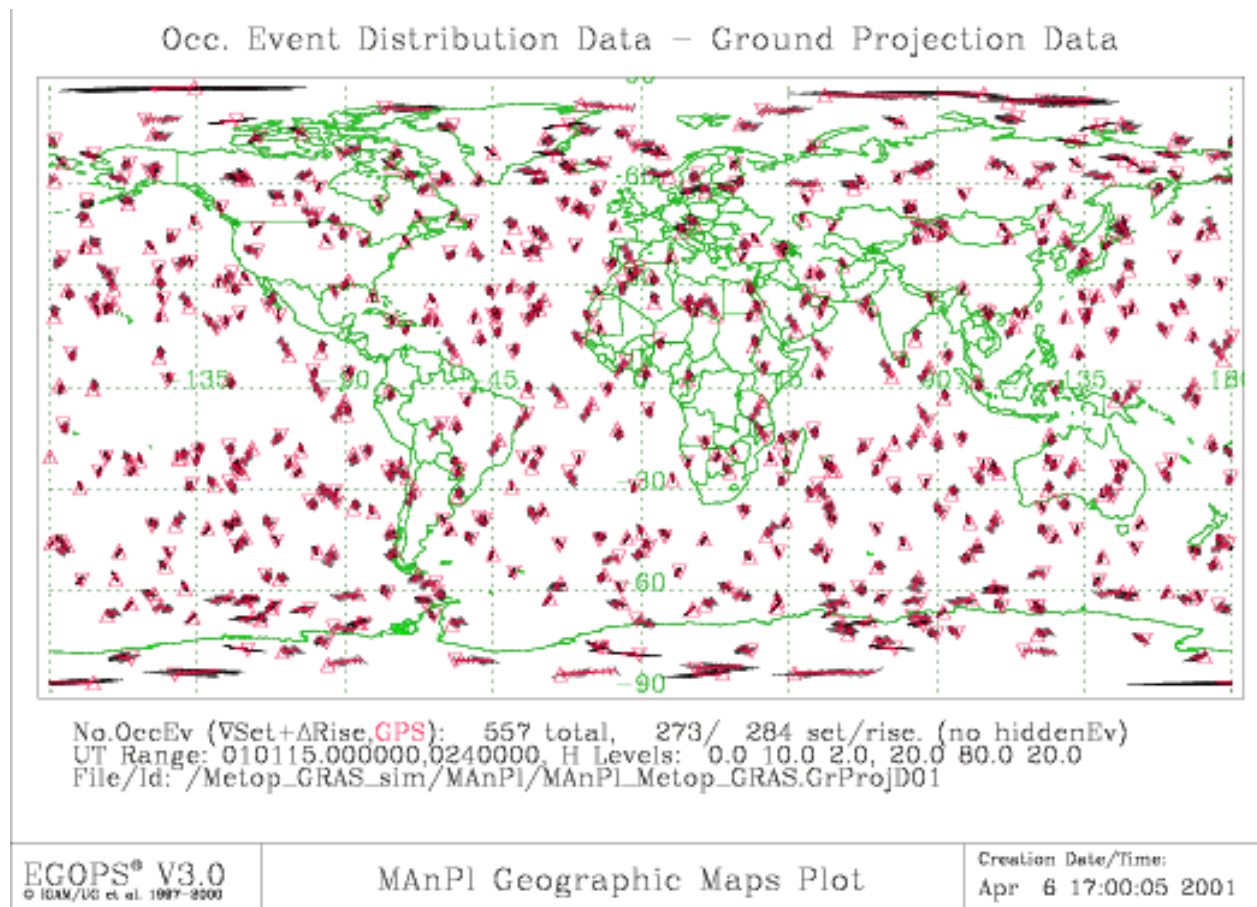
- from L2
- from L1
- ionospheric correction applied

From Luntama (2000)

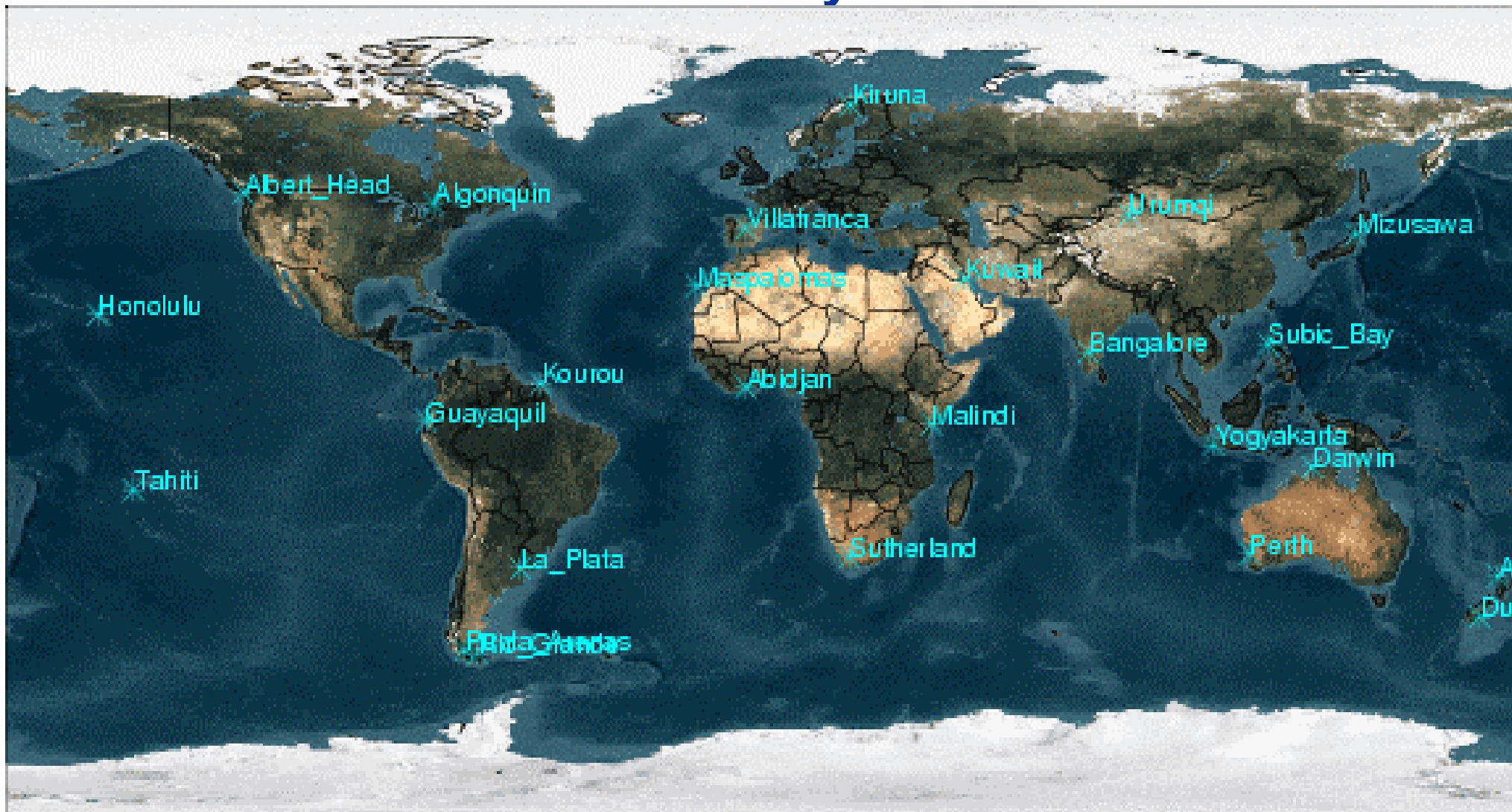




# Global distribution of simulated EPS GRAS Observations over 24 h



# GRAS is a system



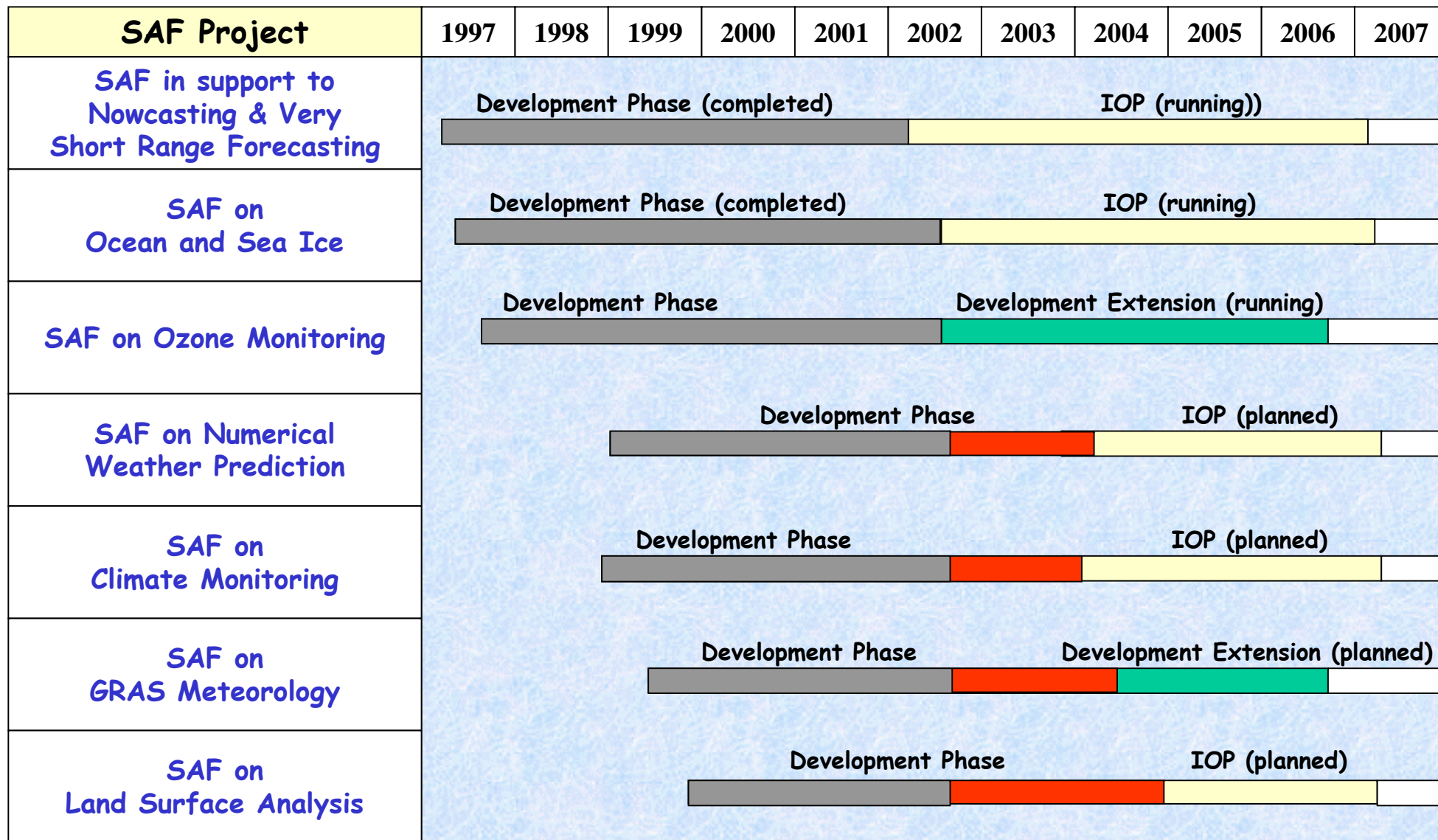
GSN coverage for the GPS constellation is  $> 200\%$   $\Rightarrow$  service availability via redundancy

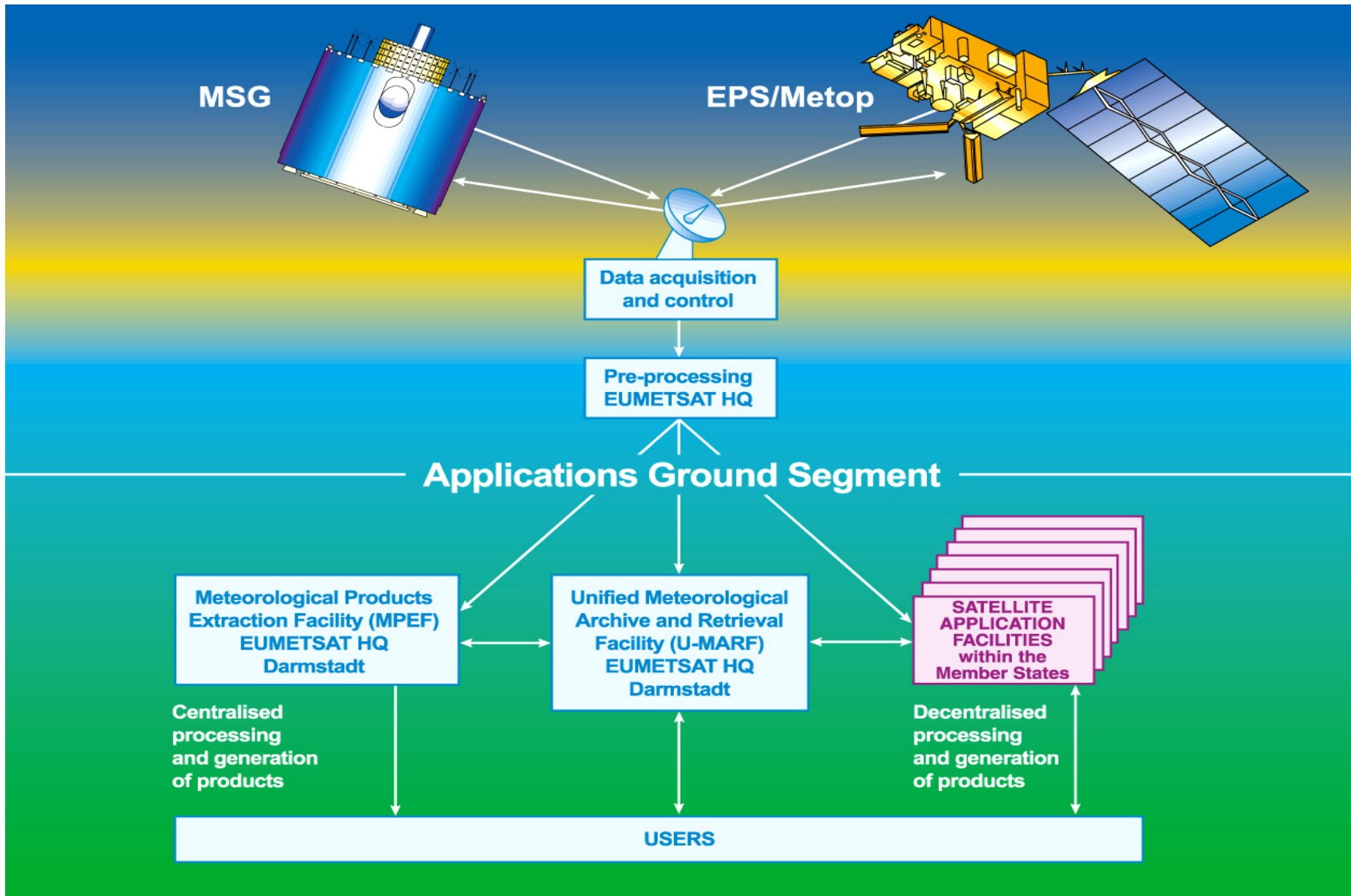


# Satellite Application Facilities (SAF)

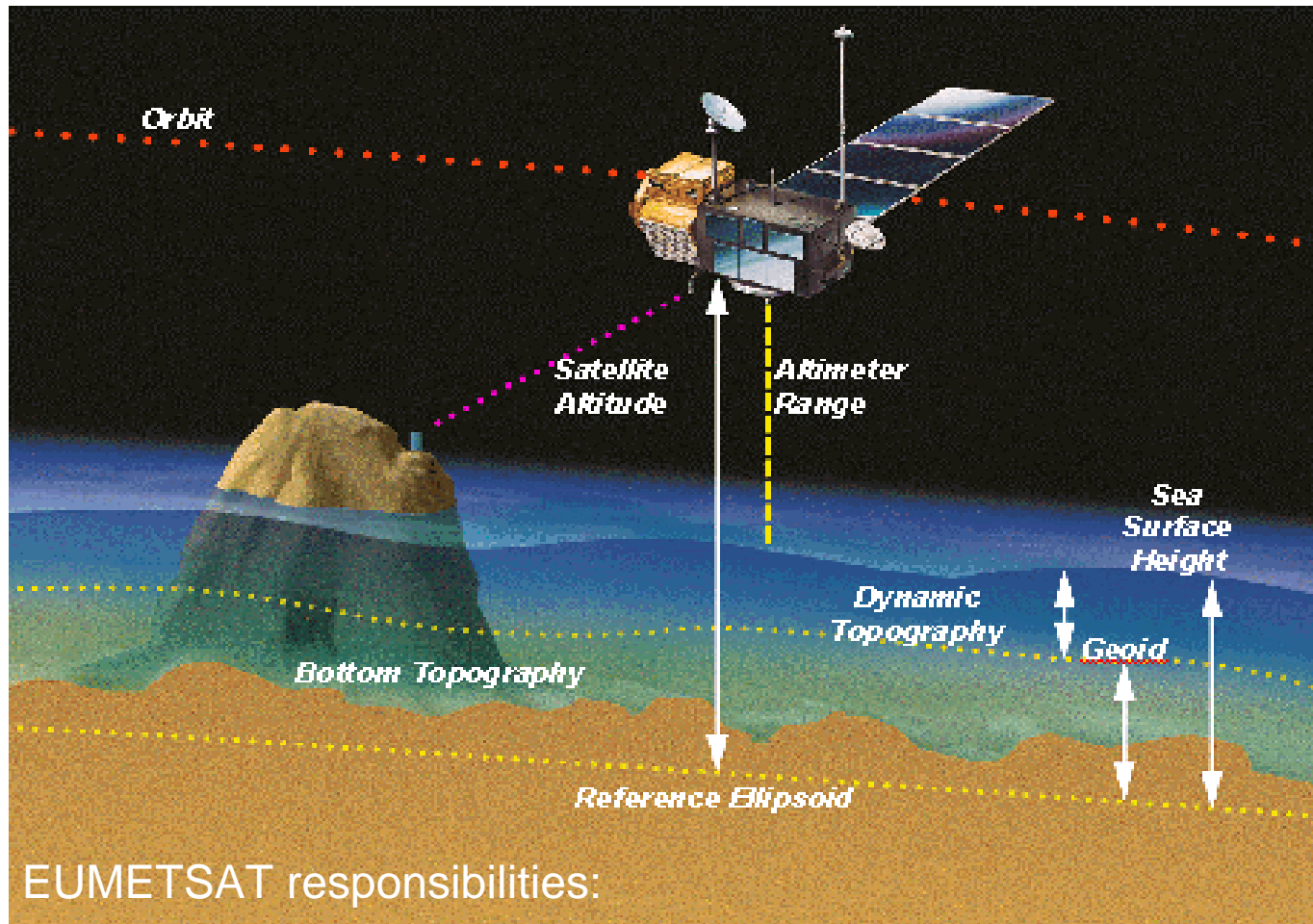
Integrated part of the distributed  
EUMETSAT Ground Segment

# SAF Network Overall Planning





# Optional Programme Jason-2



- Earth terminal, ground network
- Operational product processing and distribution
- User interface