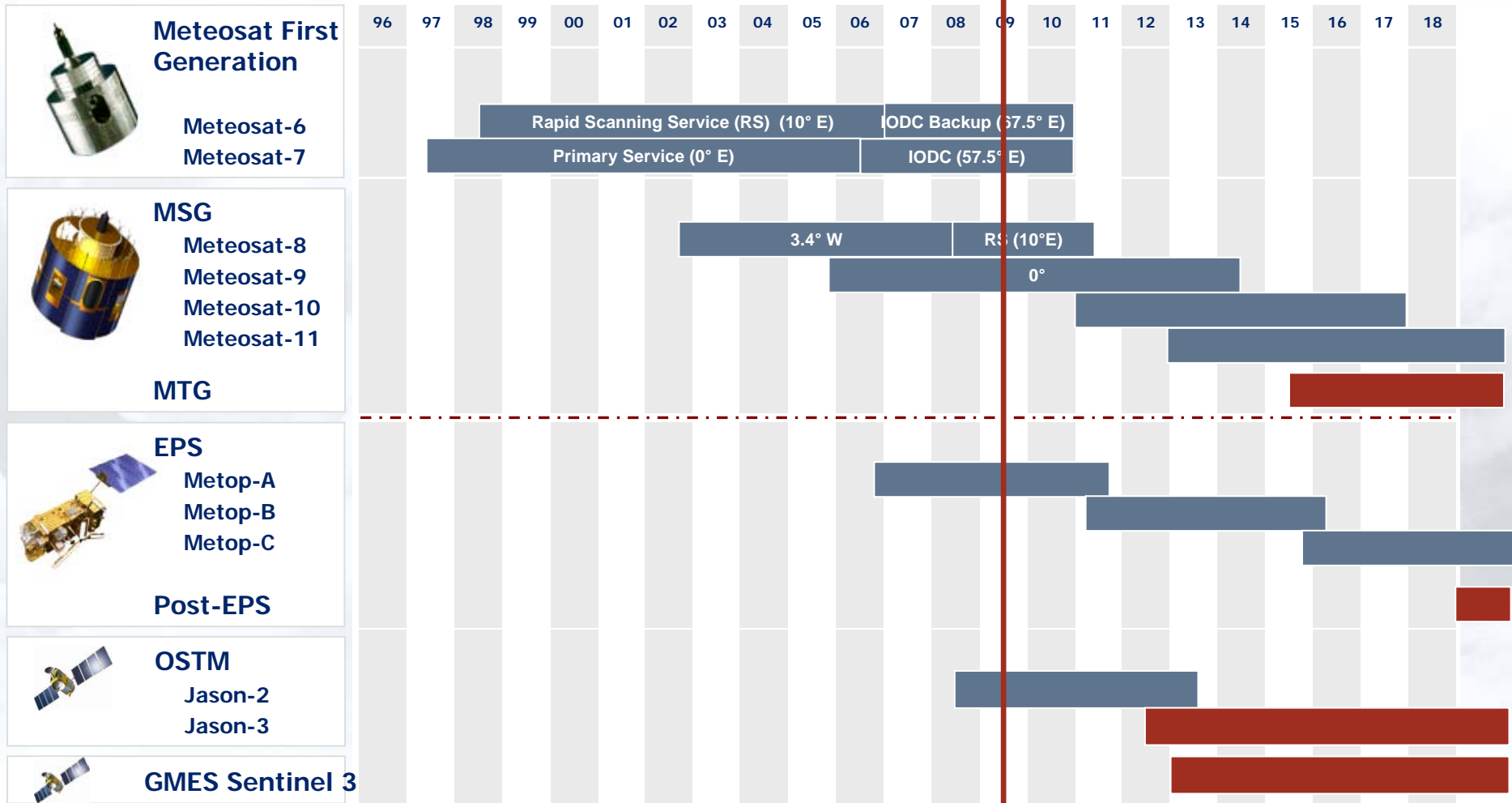




EUMETSAT Satellite Programme

Marianne König & many colleagues
marianne.koenig@eumetsat.int

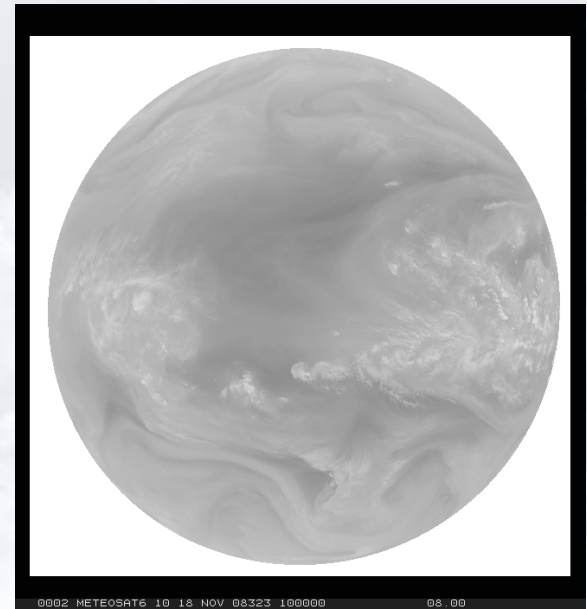
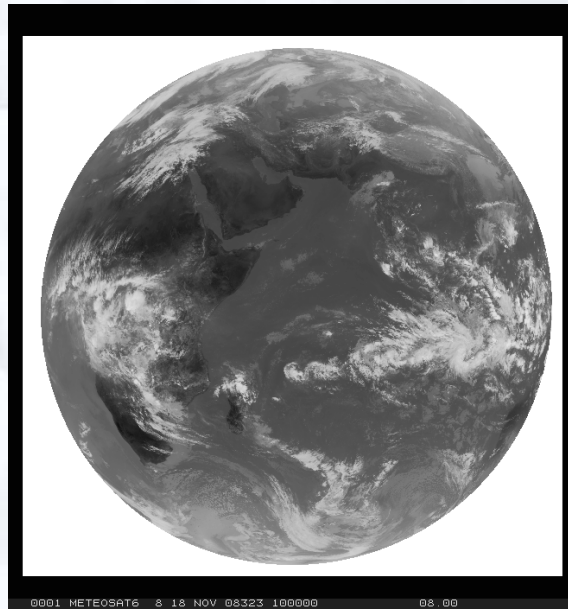
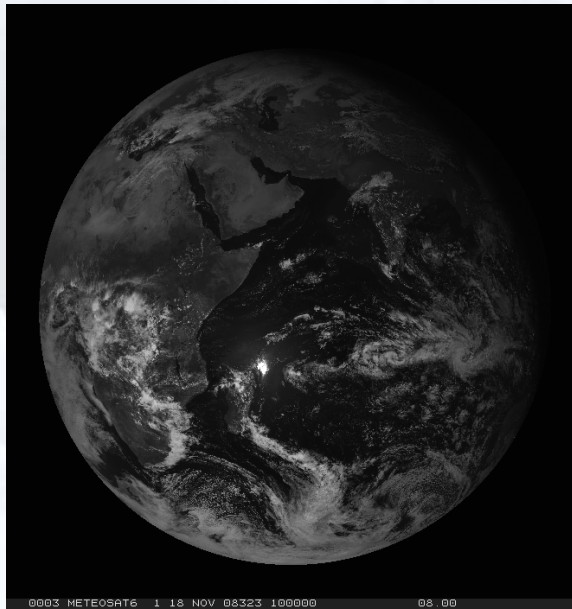
EUMETSAT Space Segment – Current and Future





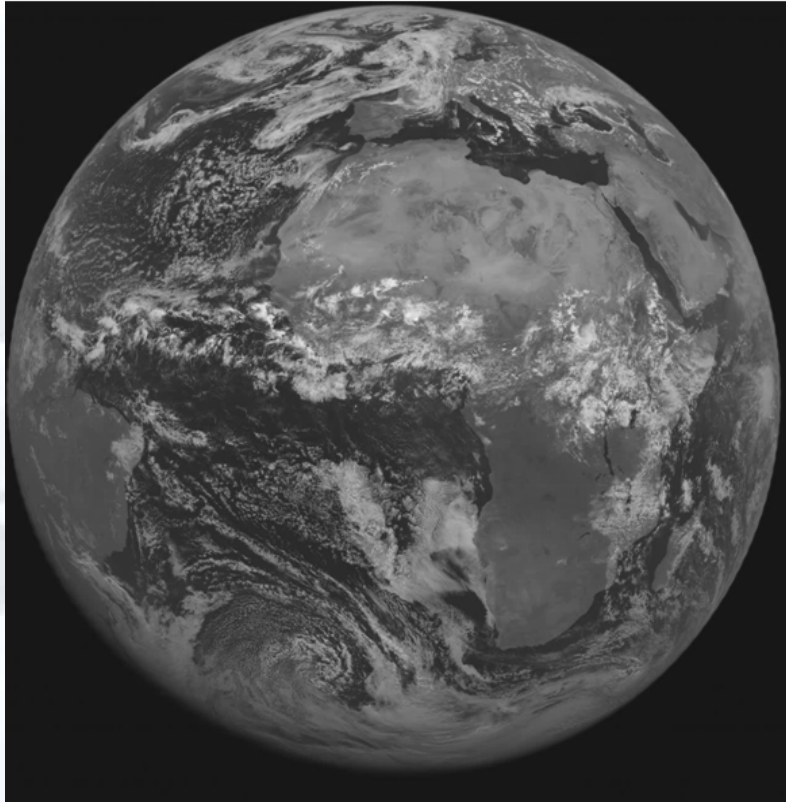
The "old" Meteosats: First Generation

Operational imager mission over the Indian Ocean
3-channel radiometer (VIS, IR, WV), image repeat cycle 30 minutes





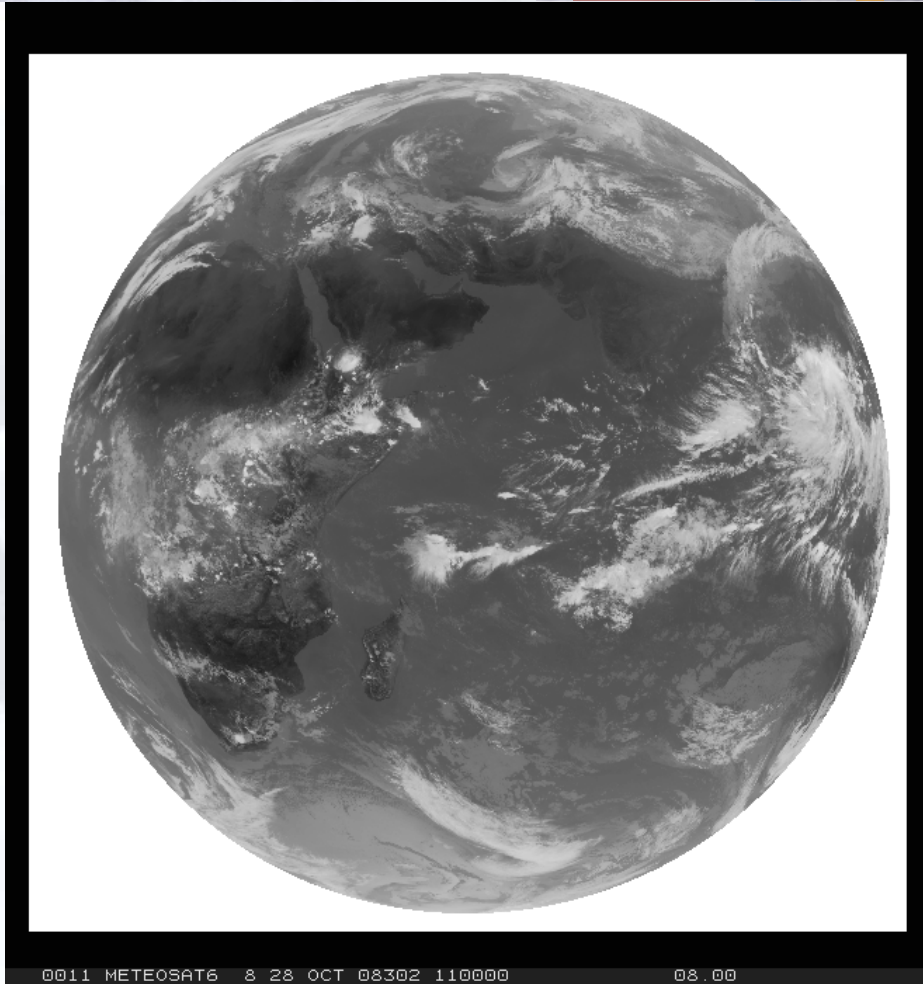
Meteosat-7: Go East!



M7 Relocation (09 Jun – 04 Oct 2006)



Meteosat-6: An Interesting Case



Radiometric Anomaly
needs correction through
cross-calibration with
e.g. MSG



MSG – Operational Service since 2004

Meteosat-8: stand-by satellite, over 10 E, currently in "rapid scan" mode

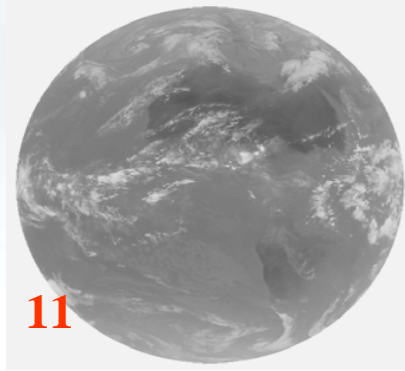
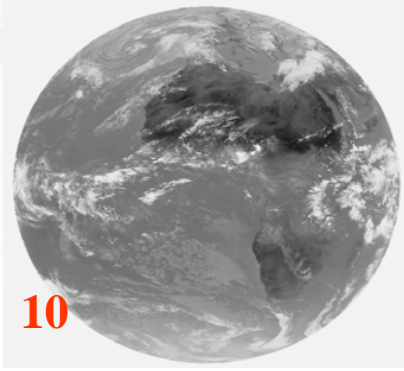
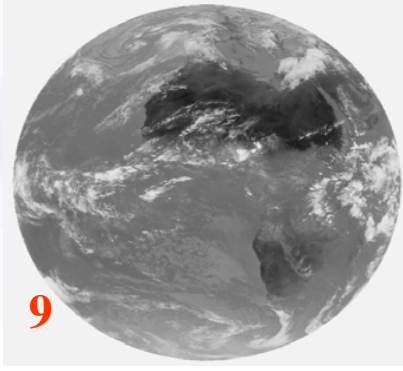
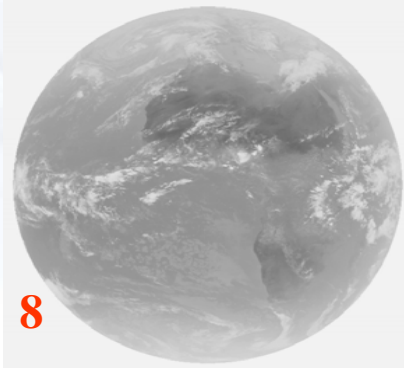
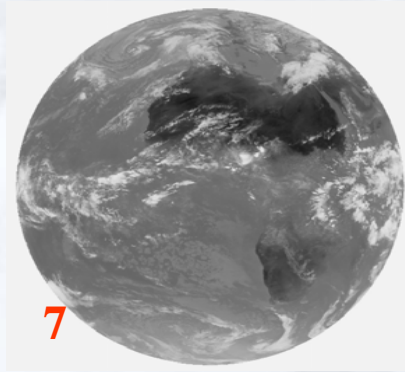
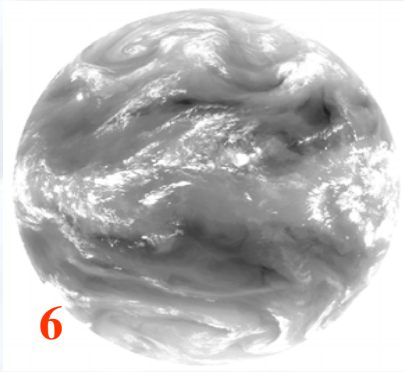
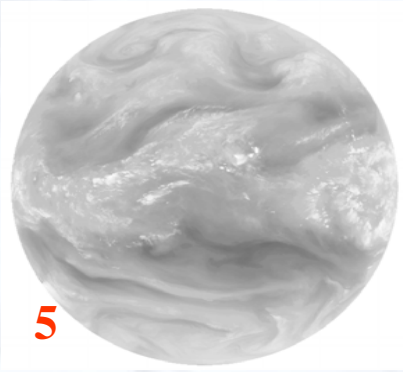
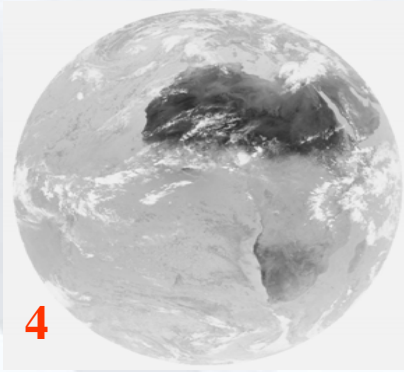
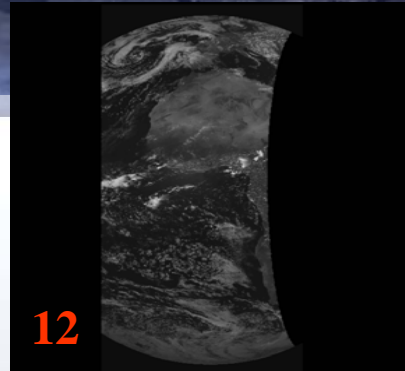
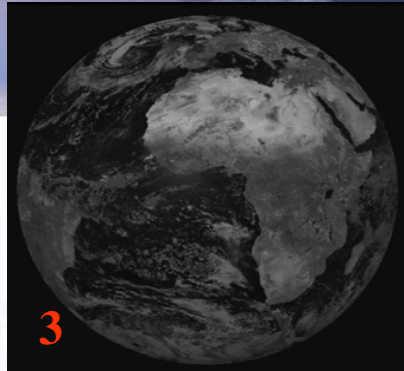
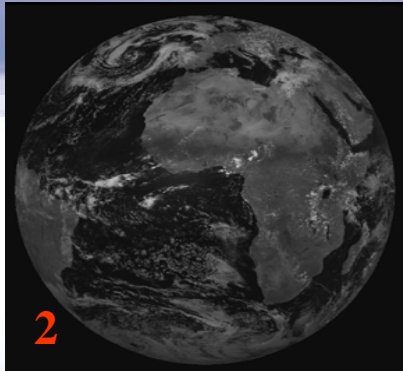
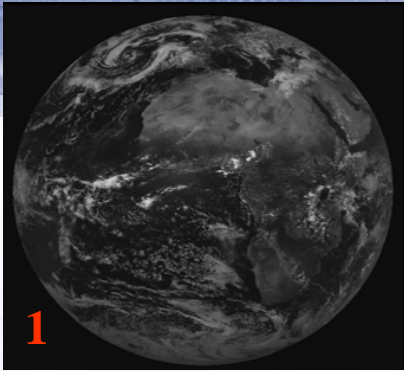
Meteosat-9: operational satellite, over 0 deg

Some MSG facts:

- 12-channel radiometer ("SEVIRI")
- 15 minute repeat cycle for full disk scans
- 3 km pixel sampling distance, 1 km for HRV
- Series of 4 MSG satellites planned



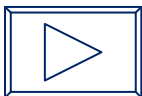
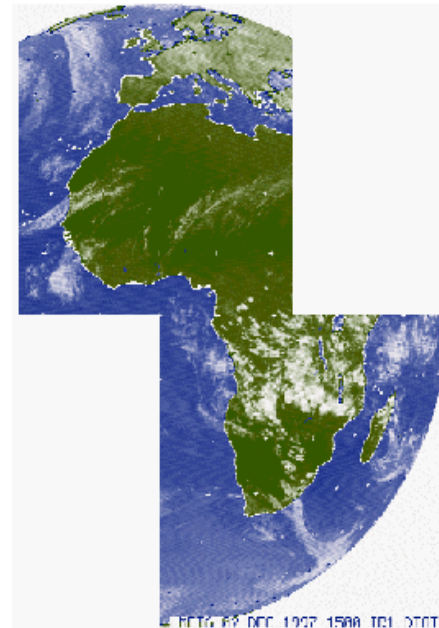
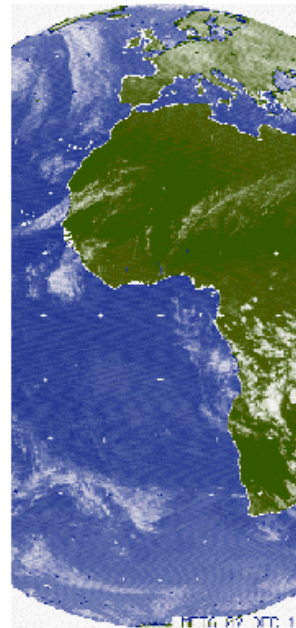
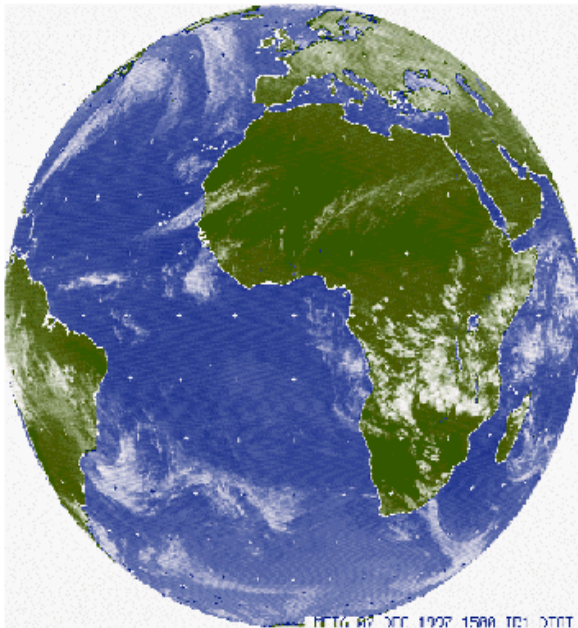
SEVIRI Overview





HRV: A Special Case

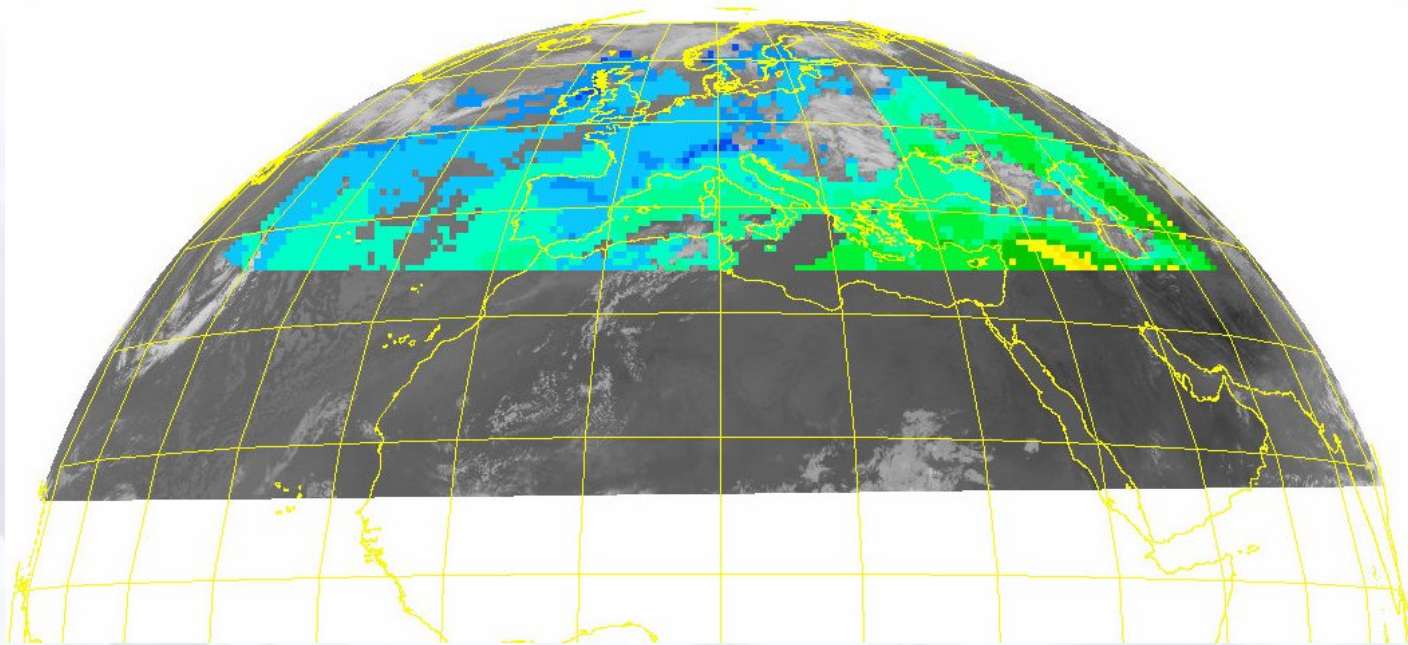
High data rate allows only transmission of half a scan line.
Two block of "half lines" can be selected.



(current setup)



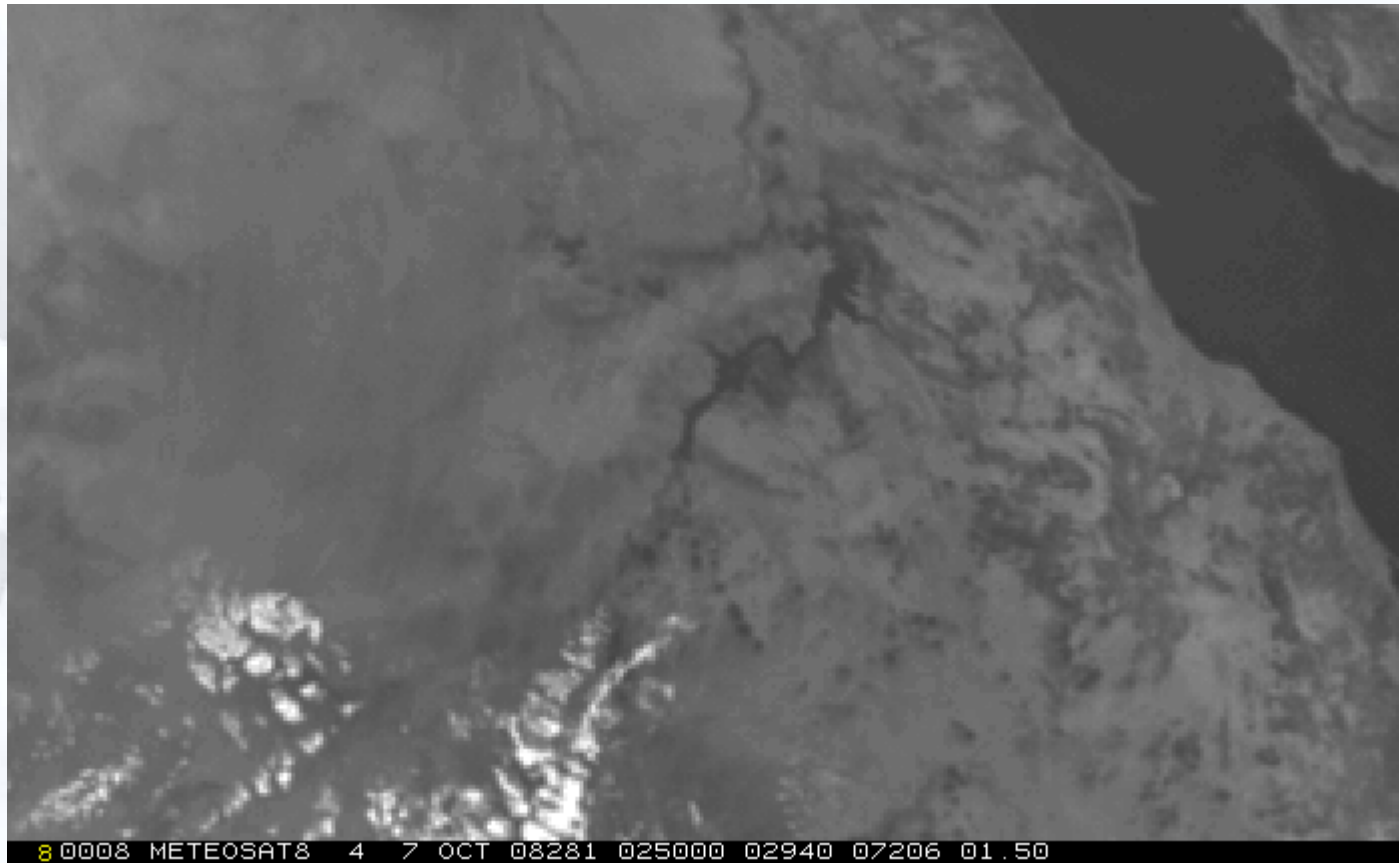
Meteosat-8 in Rapid Scan



Coverage every 5 minutes



Curious Incident Observed by Meteosat-8





MSG Benefits

Nowcasting severe convection, fog, etc.

Input to NWP (mainly through AMVs)

Airmass visualisation

Dust detection

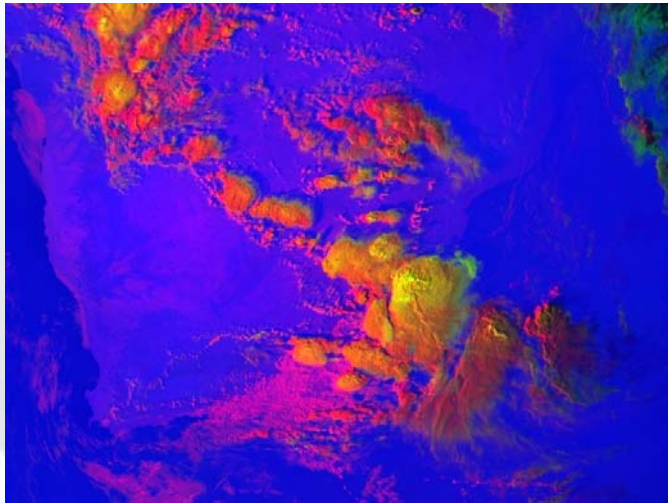
Volcanic ash detection

Detailed cloud information (microphysics)

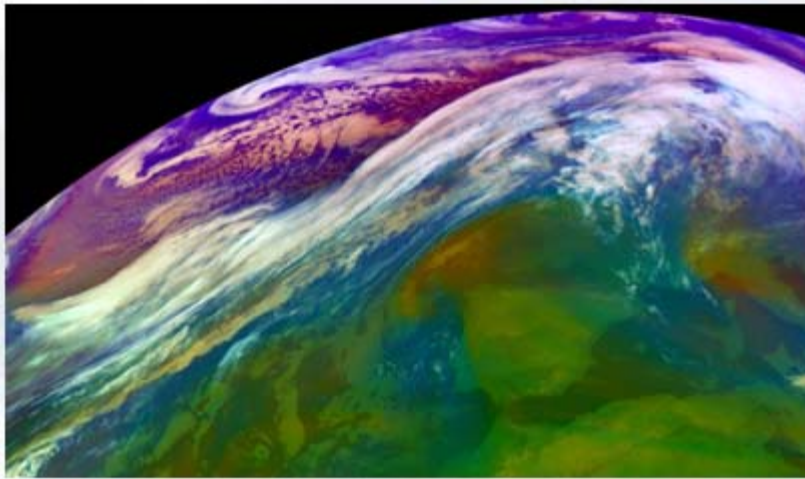


Nowcasting Aspects

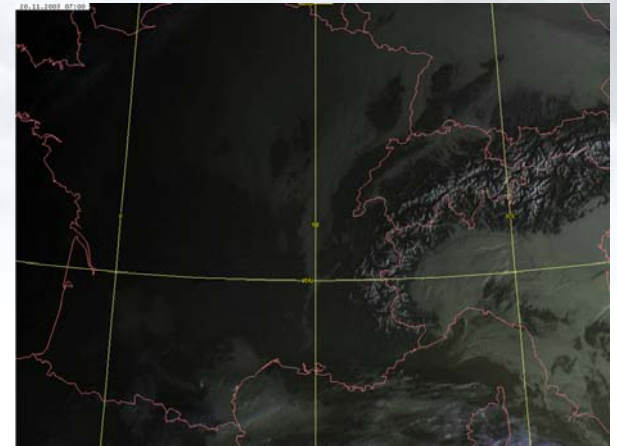
Big success of use of RGBs (set of "recommended RGBs")



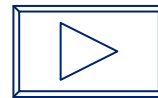
Convection loop Europe



Airmass loop Europe

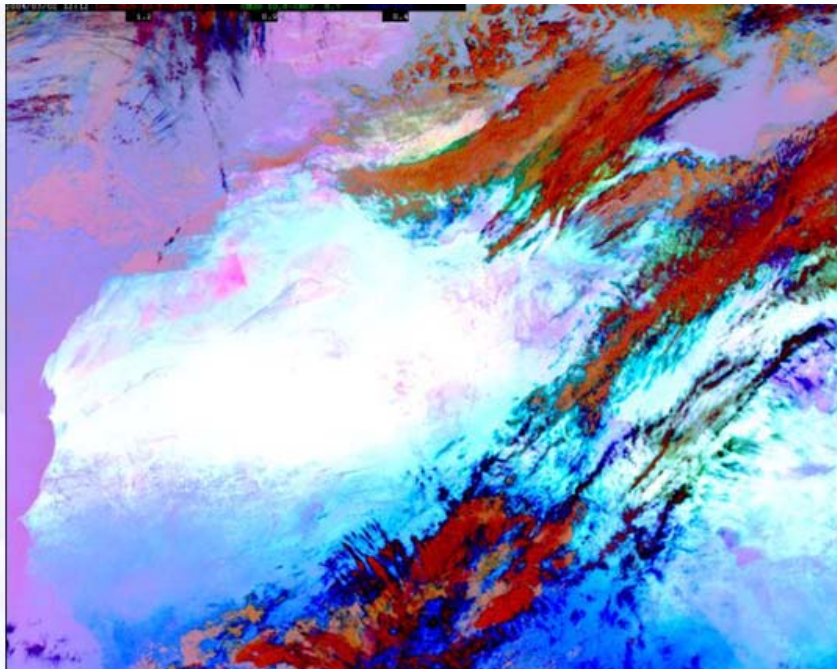


Fog over Alps

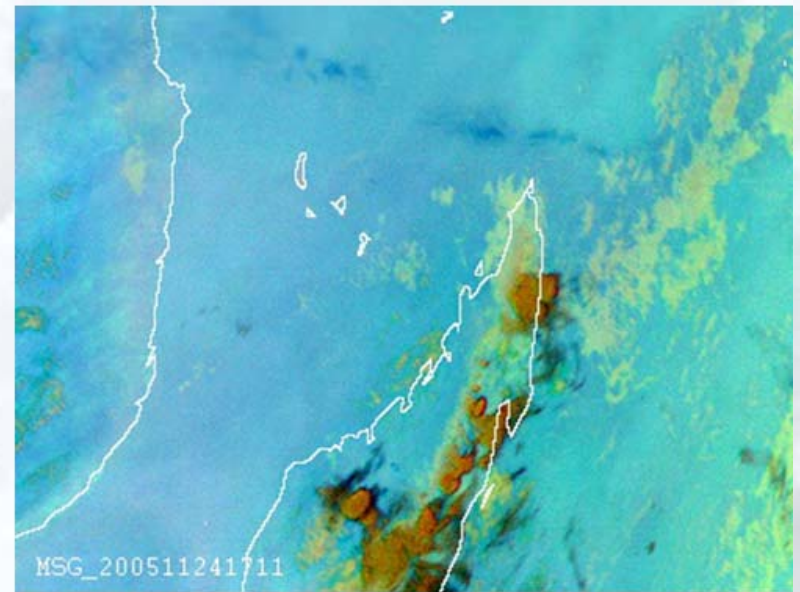




Special Events: Dust, Volcanic Ash



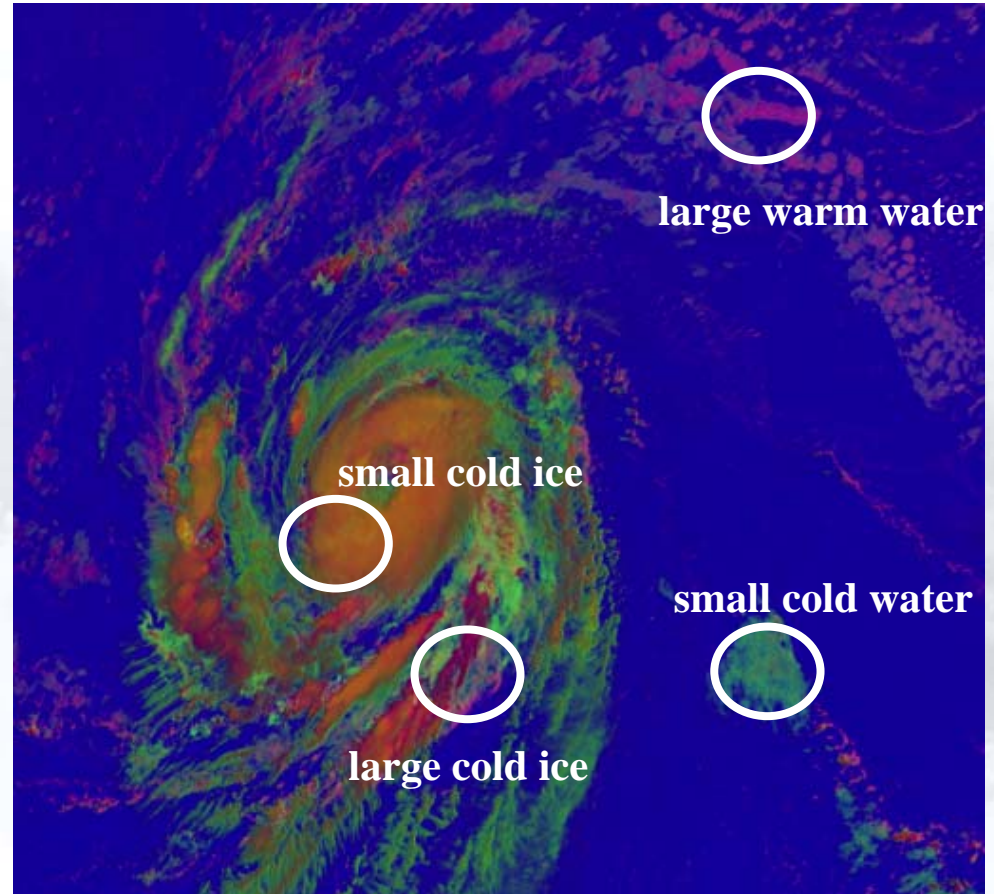
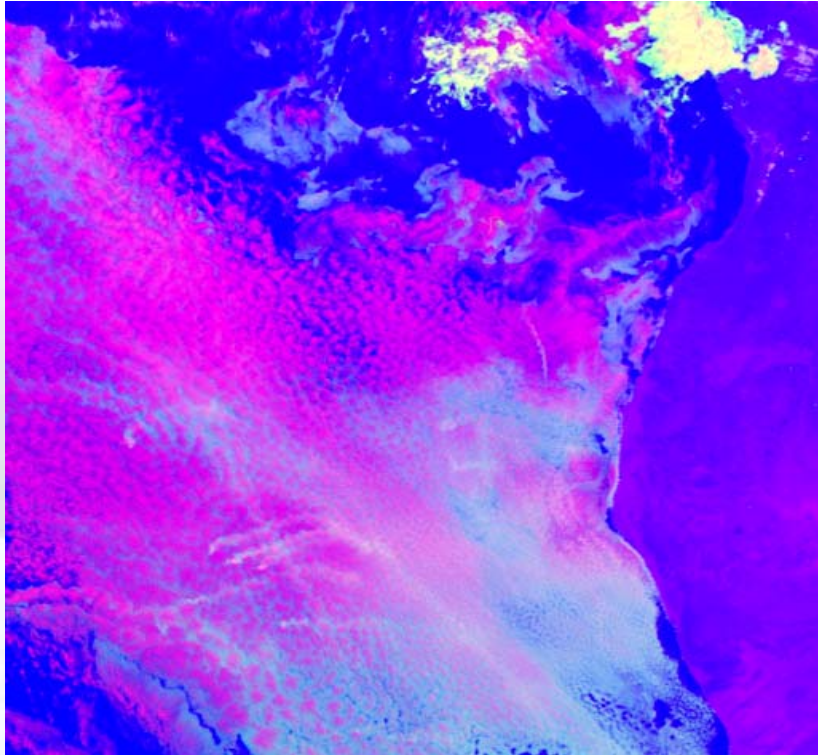
Dust outbreak over Sahara



Volcanic Eruption (Karthala)



Detailed Cloud Information





Meteosat Third Generation: Outlook

MTG IRS: Infrared Sounder

Fourier Transform Spectrometer

0.625 cm⁻¹ spectral resolution, 700 – 2175 cm⁻¹

Spatial resolution 4 km

Aim: support of NWP, mesoscale models

MTG UVN

(ultra-violet, visible and near-infrared radiometer)

Support of air chemistry

Provided as GMES Sentinel-4 instrument

MTG Lightning Imager (LI)

Detection of In-Cloud, Cloud-to-Cloud and Cloud-to-Ground Lightning Events

MTG FCI

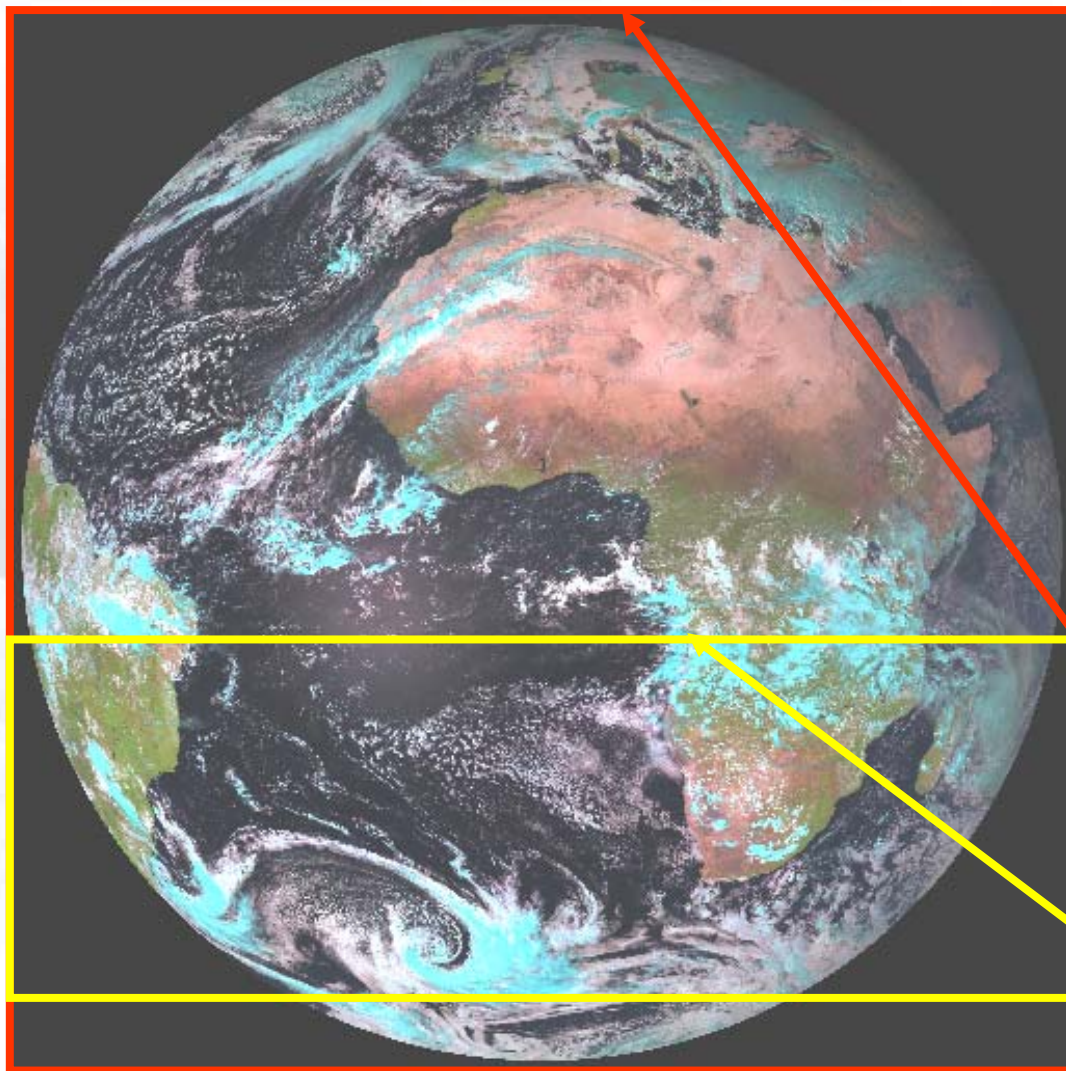
Flexible Combined Imager

16 spectral channels, 10/2.5 min repeat cycle, 0.5-2 km resolution

Current Status: Twin Satellite configuration – FCI/LI and IRS/UVN platforms, 4 FCI and 2 IRS platforms approved



Meteosat Third Generation: Outlook



MTG FCI: Flexible Combined Imager

16 spectral channels (8 solar, 8 thermal)

Improved spatial resolution: 0.5 – 2km

**Full Disk Coverage: Scan
Interval 10 min**

**Local Area Coverage:
Scan Interval 2.5 min**



EUMETSAT's Polar System: Metop (not MetOp!)



Launched from Baikonur in October 2006

Metop-A in orbit 2007

Metop-A



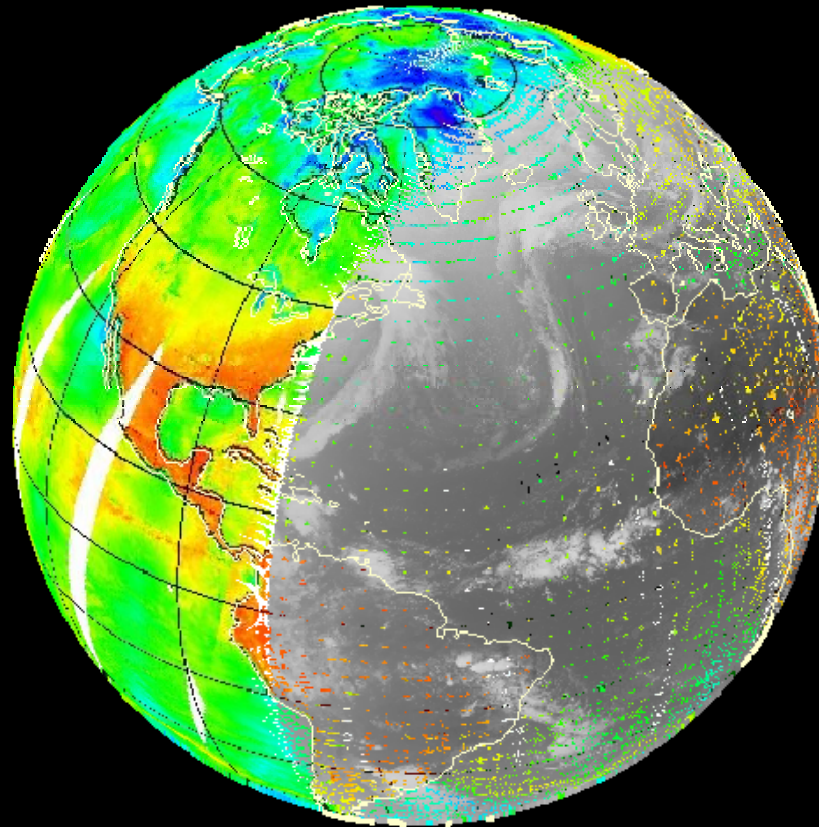
Metop-A ASCAT mid-beam antenna flare 19 April 2007 223652 CEST

© Dieter Klaes



Global View!

Courtesy H.P. Roesli, image produced with IDV



**data composite of Meteosat-8 and Metop-A
SEVIRI 10.8um - MHS 89GHz**

EPS/Metop is part of the Initial Joint Polar System (IJPS)

Fairbanks, Alaska

Wallops Island, MD

Suitland, MD

Svalbard, Norway

Darmstadt, Germany

Metop

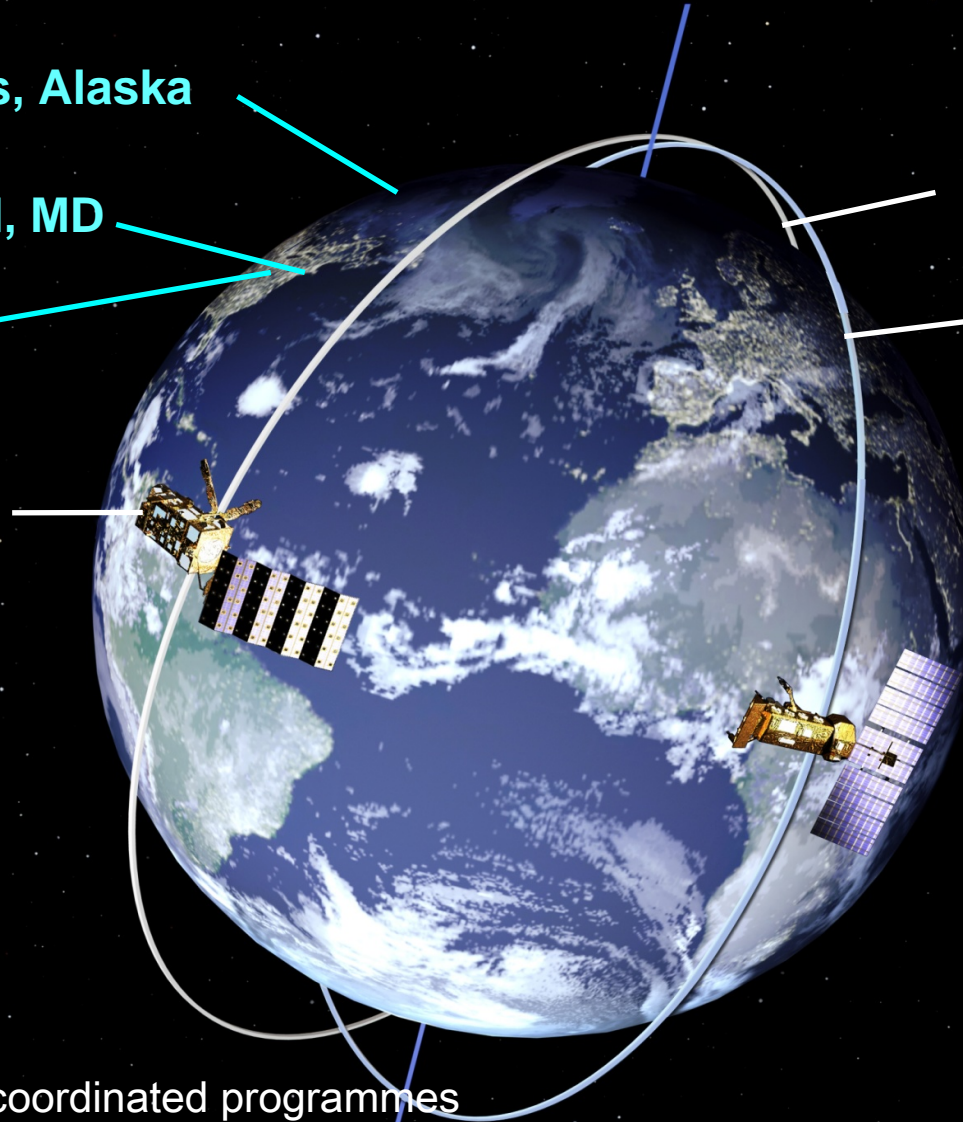
Metop-A (in orbit)
Metop-B (2012)
Metop-C (2016)

— POES

NOAA-18 (in orbit)
NOAA-N' (2009)

**Sun-synchronous
Orbit of 102
minutes
14.1 orbits per day**

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



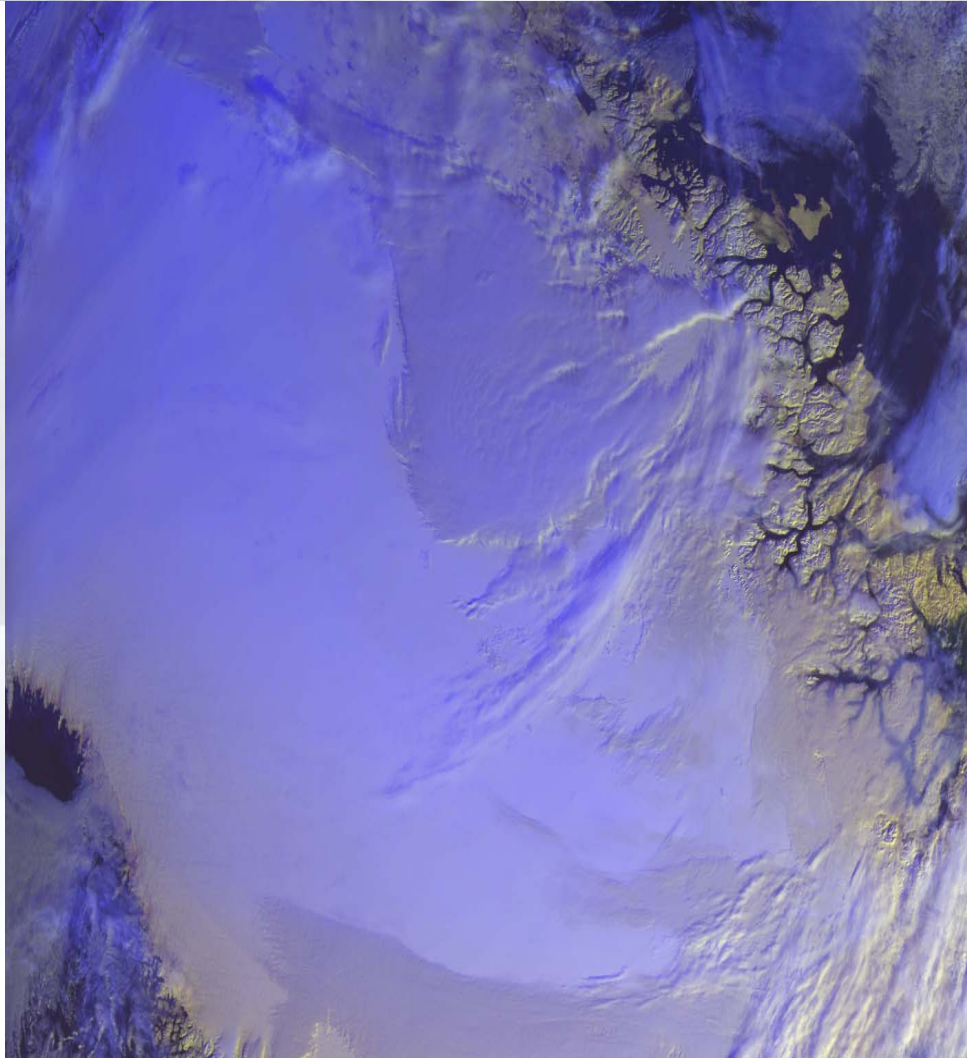


Instruments on Metop

- AVHRR – traditional imaging (US, 1 km resolution)
- HIRS/AMSU – traditional sounding (US)
- MHS – Microwave Humidity Sounder (EUR)
- GOME – UV instrument to support air chemistry (EU)
- IASI – infrared sounder (EU)
- GRAS – radio-occultation (sounding, EU)
- ASCAT – active radar, scatterometer (EU)

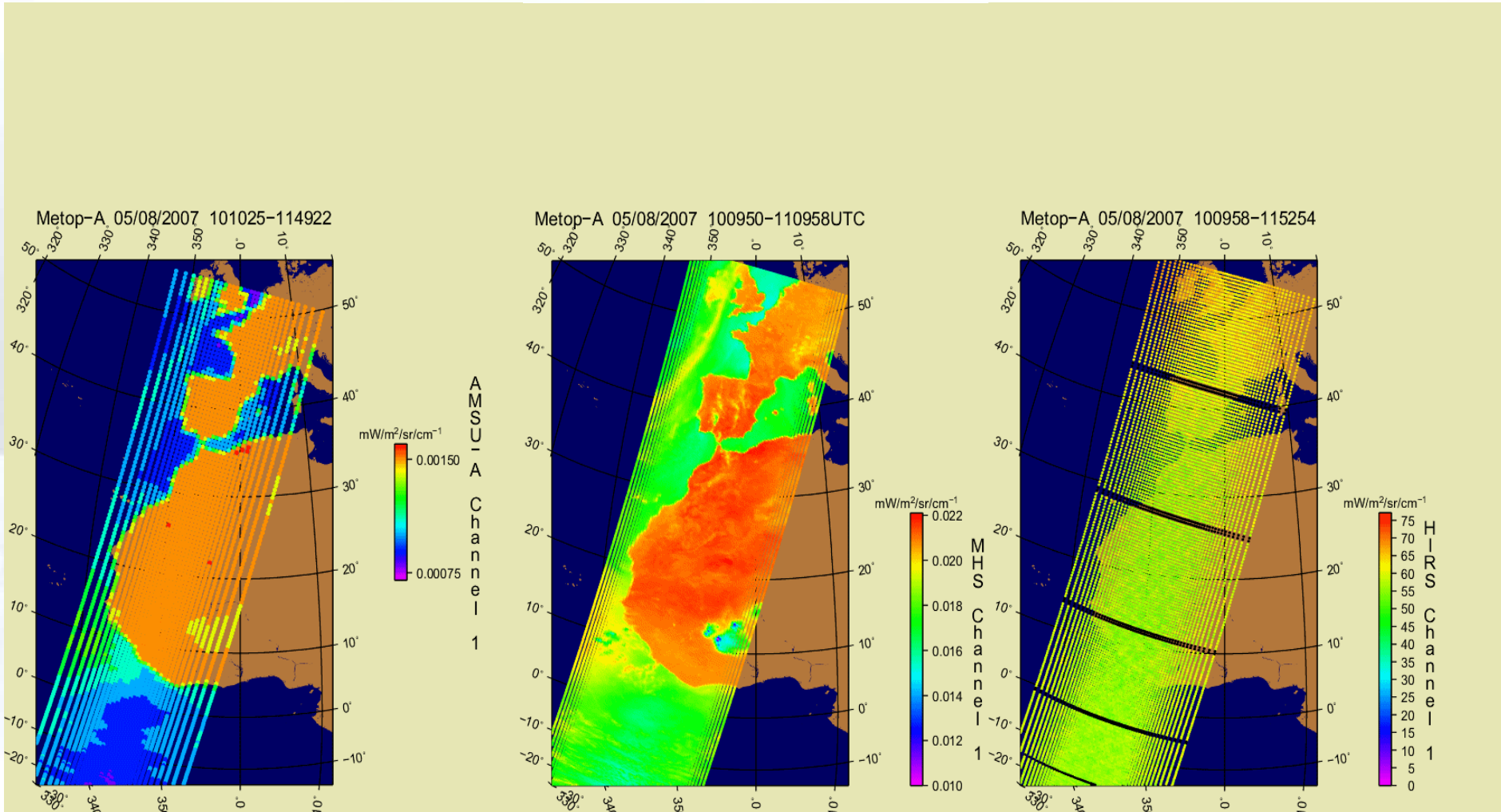


Greenland seen by AVHRR



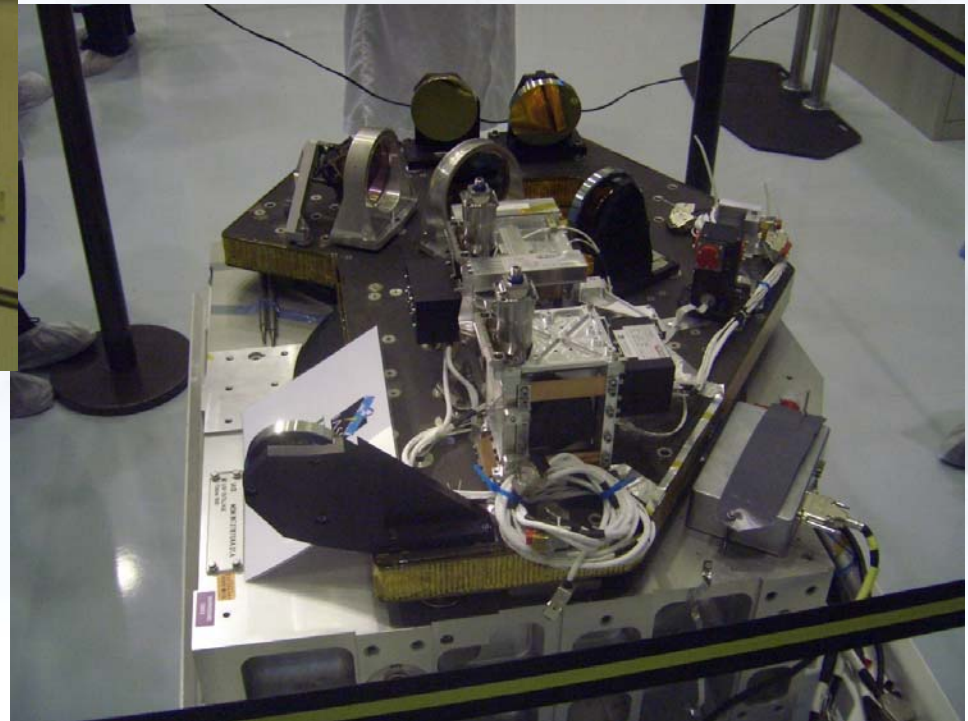
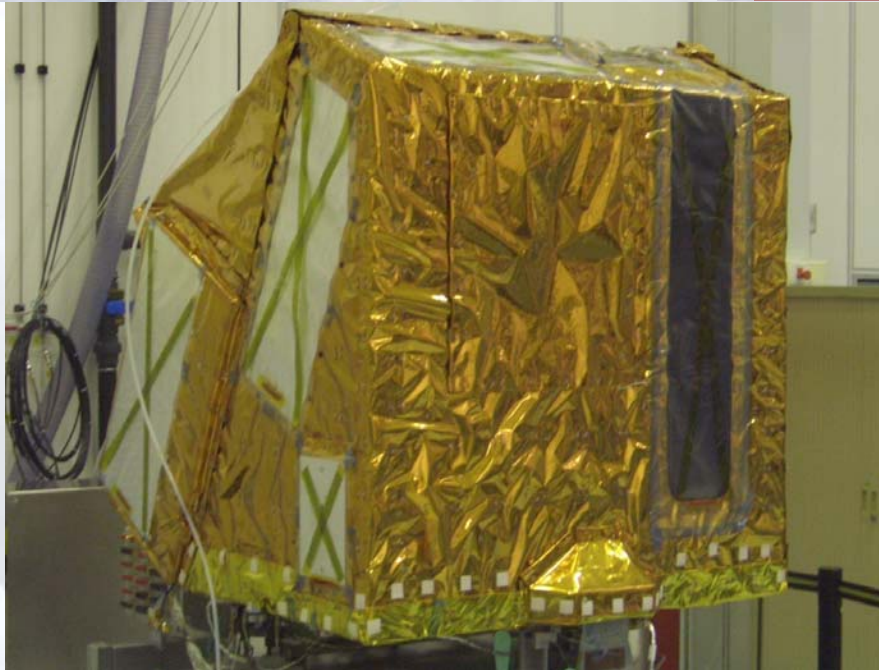


ATOVS and MHS: Vertical Sounding



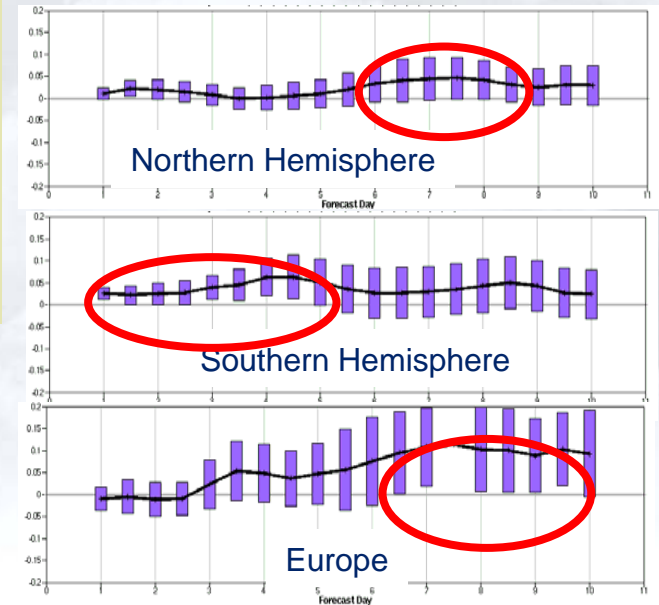
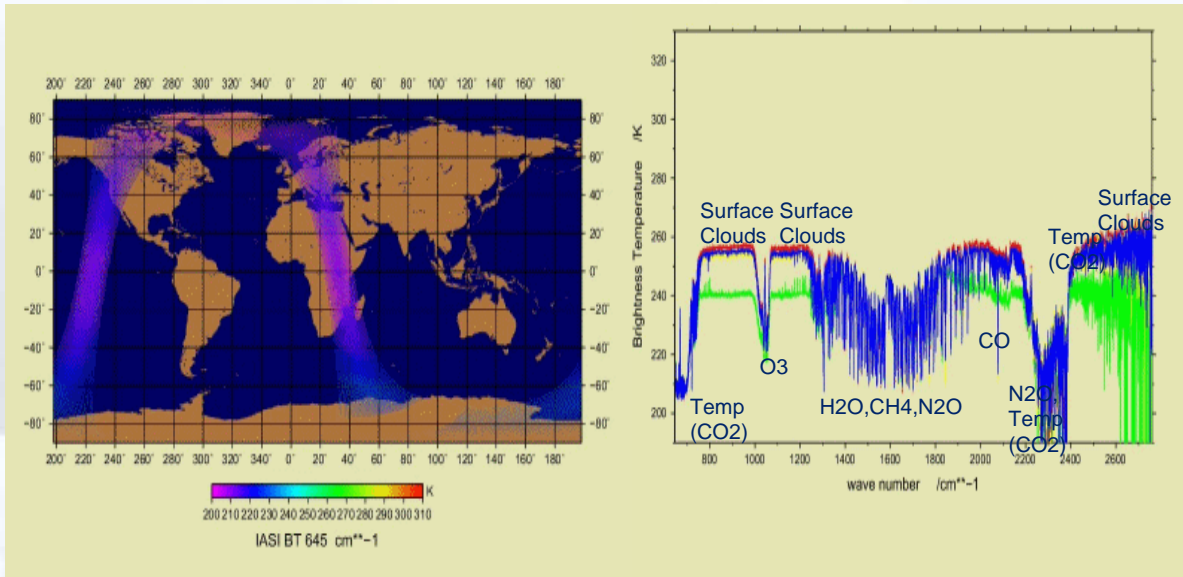


Hyperspectral Sounding - IASI





IASI Spectral Coverage, 8461 spectral samples



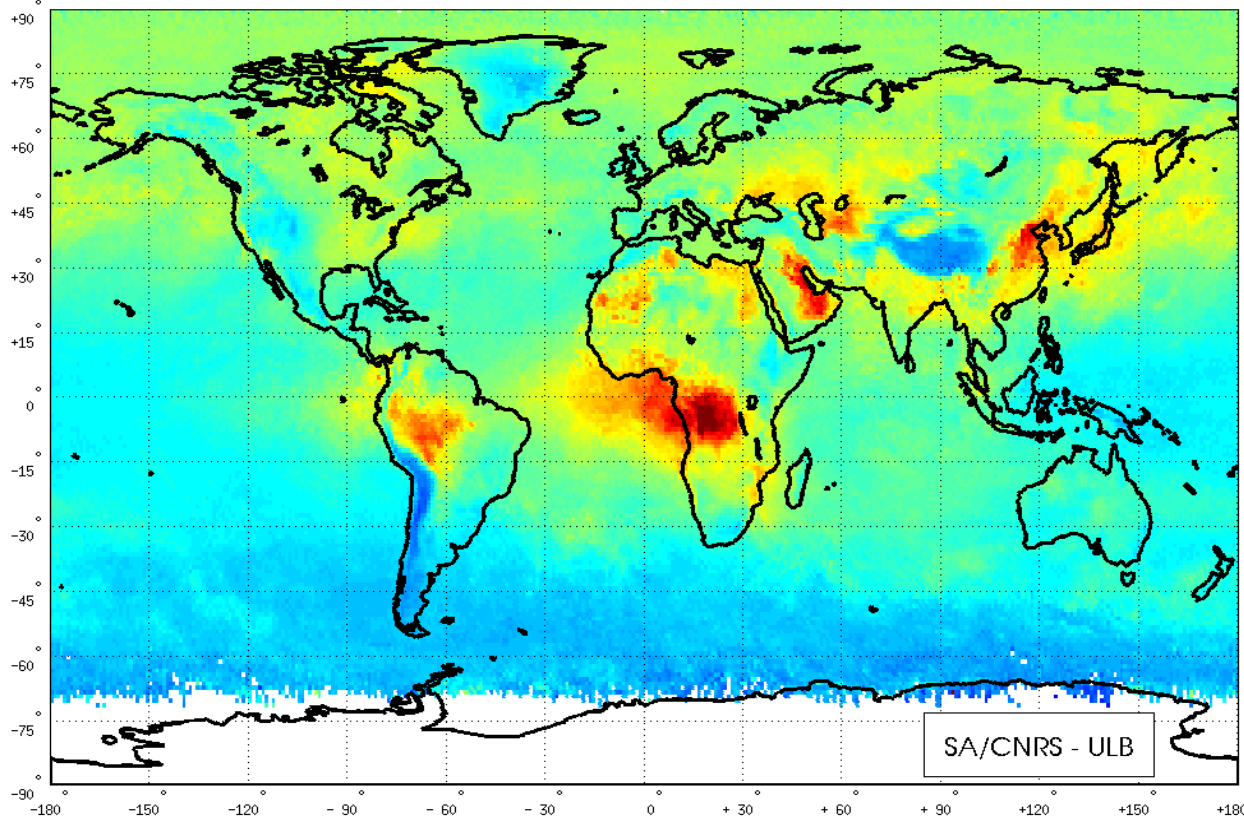
(courtesy ECMWF)



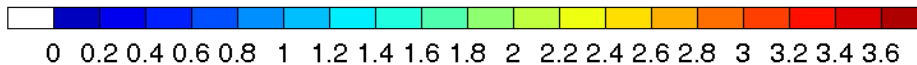


IASI Trace Gas Retrievals

day IASI CO200808



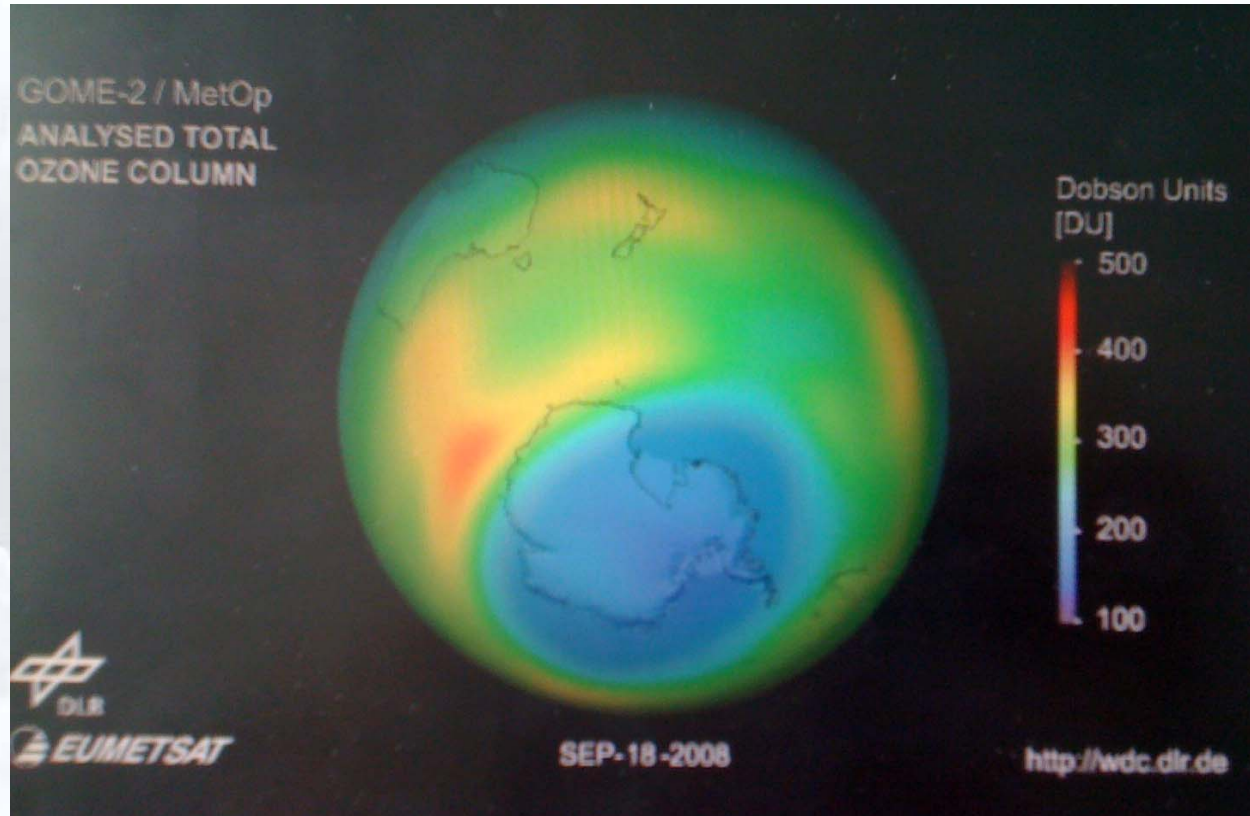
CO total (1.e18 molecules/cm²)



Credit M. Pommier/ P. Coheur/ D. Hurtmans, 2008



GOME Ozone Produce



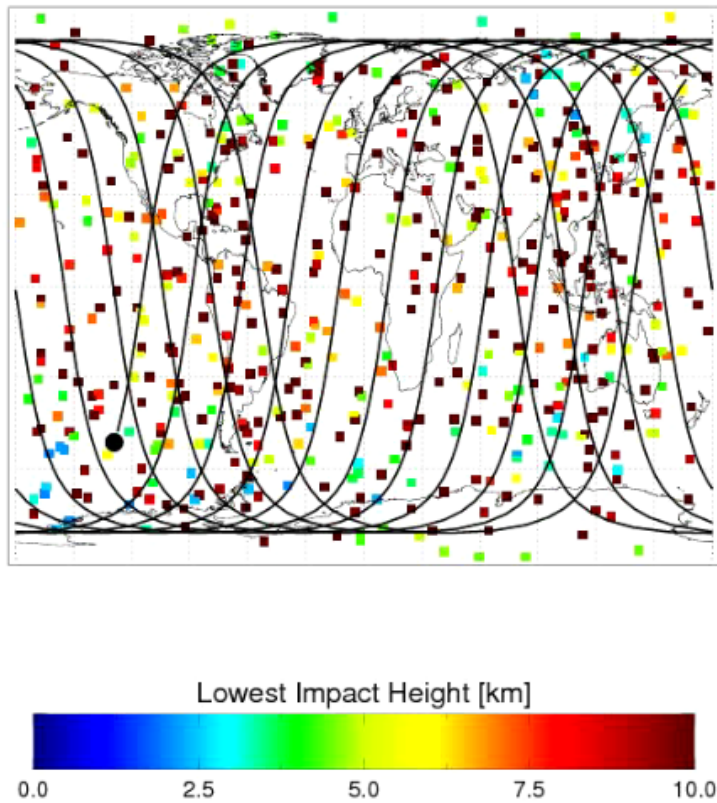
Antarctic ozone "hole" 2008



GRAS Radio-Occultations



(click for loop)

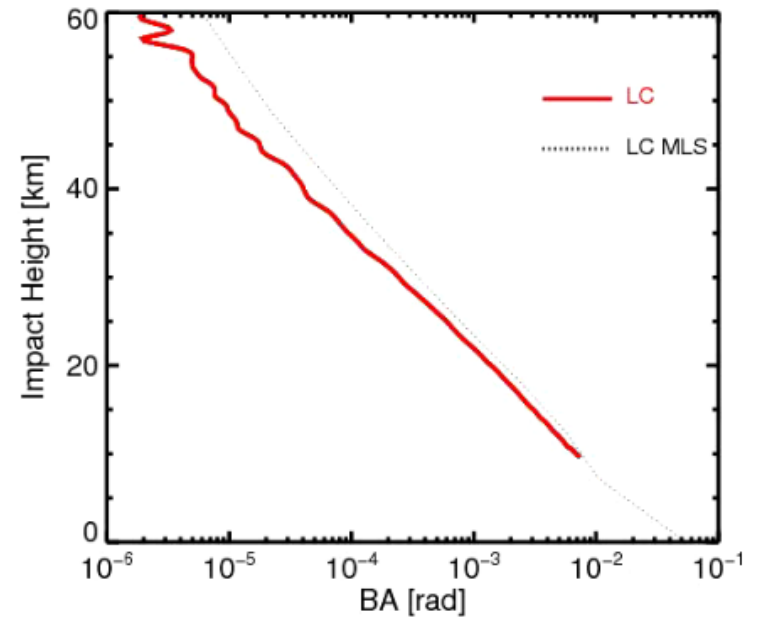


Date: 2008/05/26 17:20

Total: 511

Type: Rising

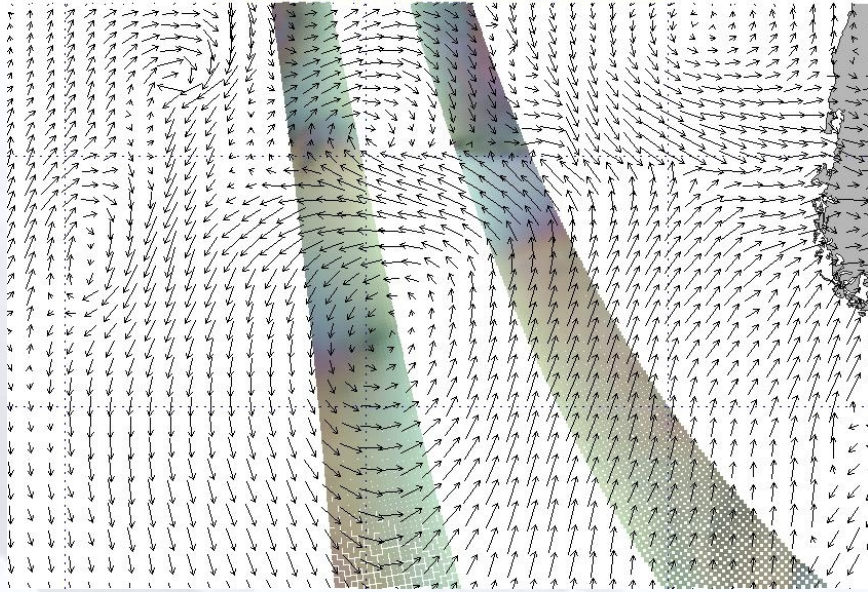
Lat / Lon: -75.0 / -170.6



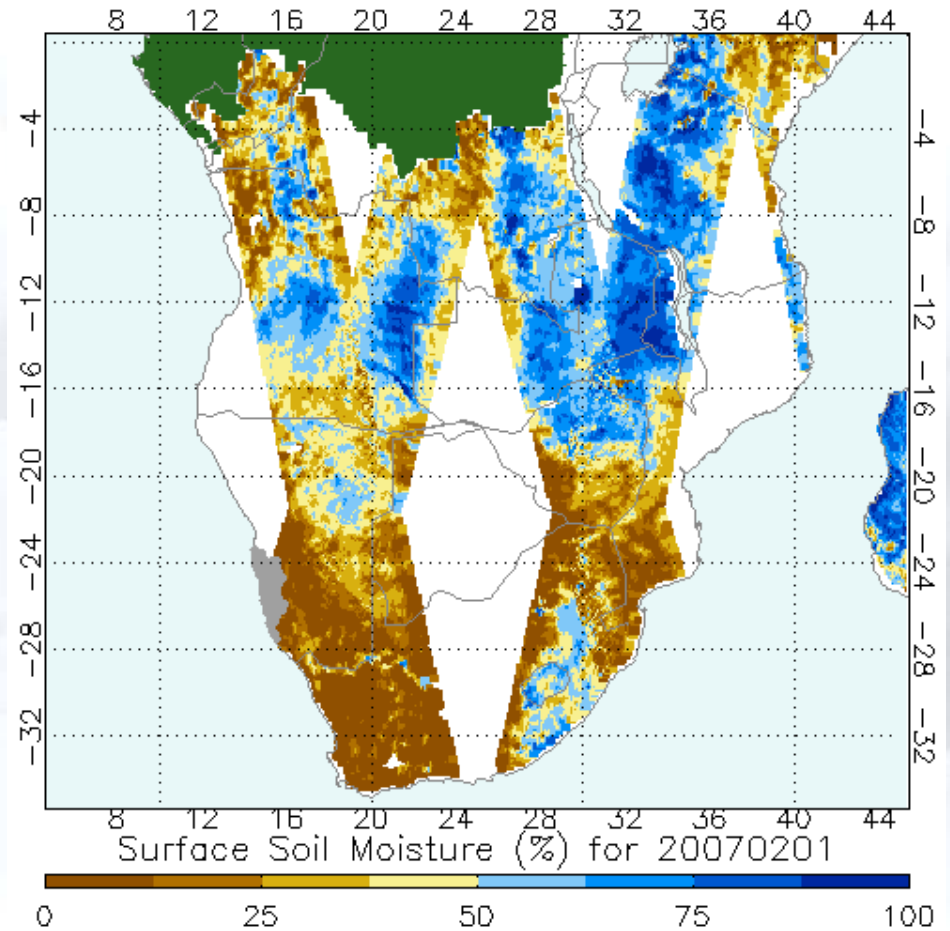


Ascat: Surface Radar Reflectivity

ASCA_SZO_1B_M02_20080408045100Z_20080408063258Z_N_O_20080408063829Z



Ocean Surface Winds (KNMI)



Soil Moisture (EUMETSAT and University Vienna)





JASON: Oceanographic Data

JASON-2 was launched on 20 June 2008
NASA / NOAA / CNES / EUMETSAT satellite
To be followed by JASON-3 and Sentinel-3

Main payload:

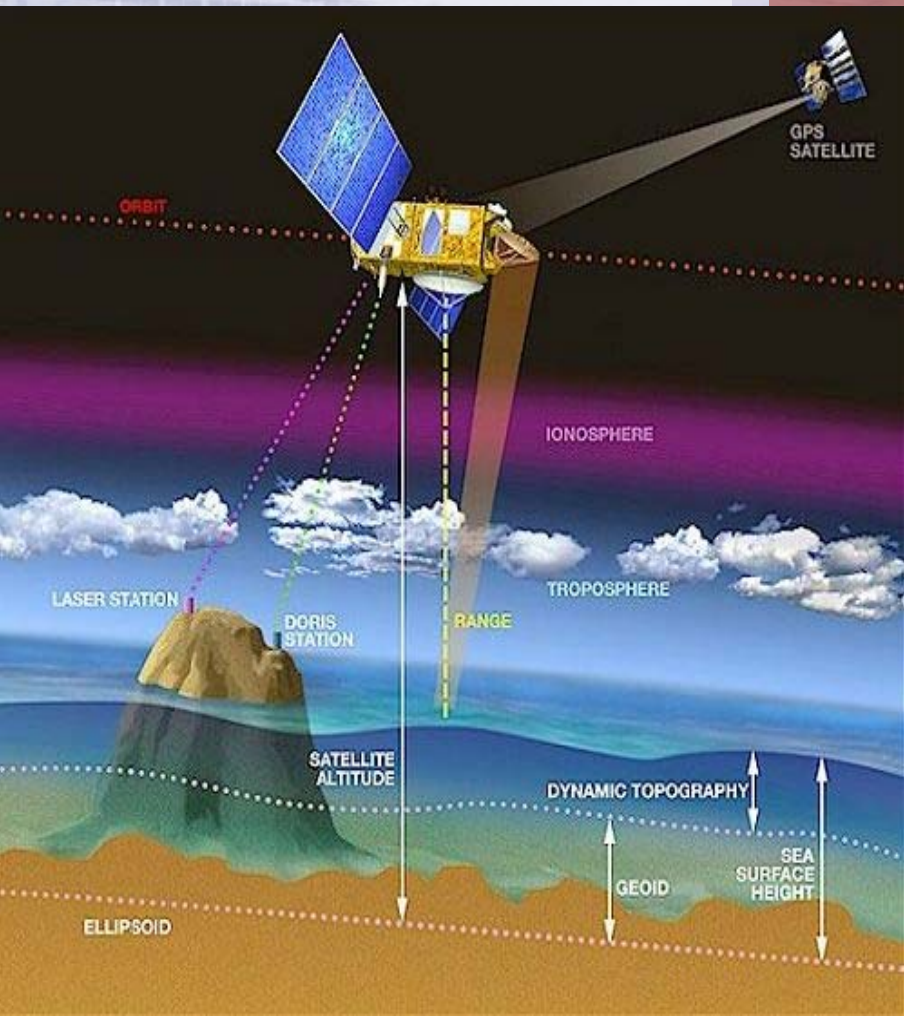
Poseidon altimeter (nadir viewing), 13.6 and 5.3 GHz

Microwave instrument to correct for atmospheric humidity

Orbit determination instruments (within 3 cm)



JASON Products



- Altimeter measures
- Sea Surface Height
 - Significant Wave Height
 - Surface Wind Speed

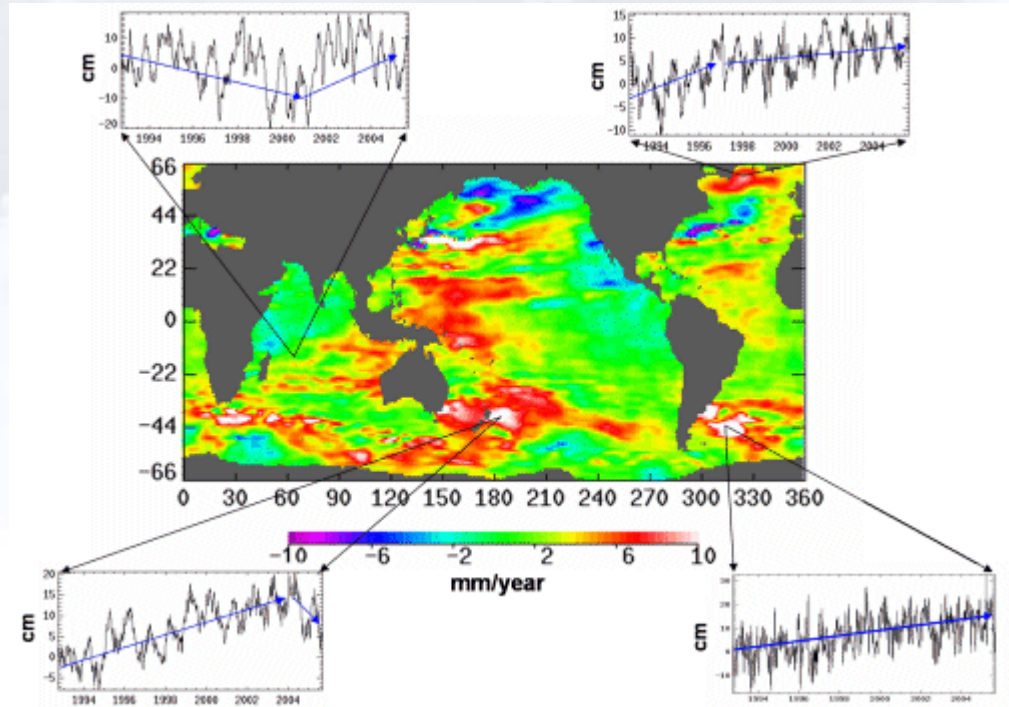
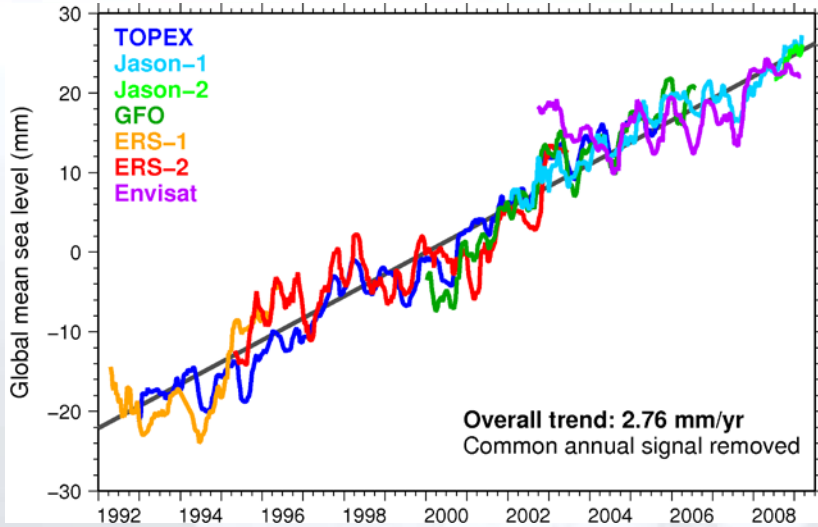


JASON Products

	Products	Main Variables	Frequency	Application Class
1	Operational Sensor (Geophysical) Data Record (OSDR/OGDR)	Significant Wave Height (SWH) Surface Wind Speed (WIND) Sea Surface Height (SSH)	3 hours	Nowcasting Operational Wave Forecasting
2	Interim Geophysical Data Record (IGDR)	Sea Surface Height (SSH) Absolute Dynamic Topography (ADT) Ocean Geostrophic Velocities	Daily**	Medium-Range Forecasting Seasonal Forecasting Ocean Weather
3	Geophysical Data Record (GDR)	Sea Surface Height (SSH)	10 daily (one repeat cycle)	Climate Monitoring Sea level Rise Climate Modeling



JASON Product: Sea Level Rise





New Building – and new Office Cooling System





New Logo ;))





The End!

Thank you!

Merci!

Danke!