



## The EUMETSAT Satellite Application Facility on Ozone and Atmospheric Chemistry Monitoring

GMES Operational Capacity Workshop  
Sofia, 25-26 March 2010



Deutsches Zentrum  
für Luft- und Raumfahrt e.V.  
in der Helmholtz-Gemeinschaft

*Pieter Valks and the O3M-SAF team*





## *Outline*

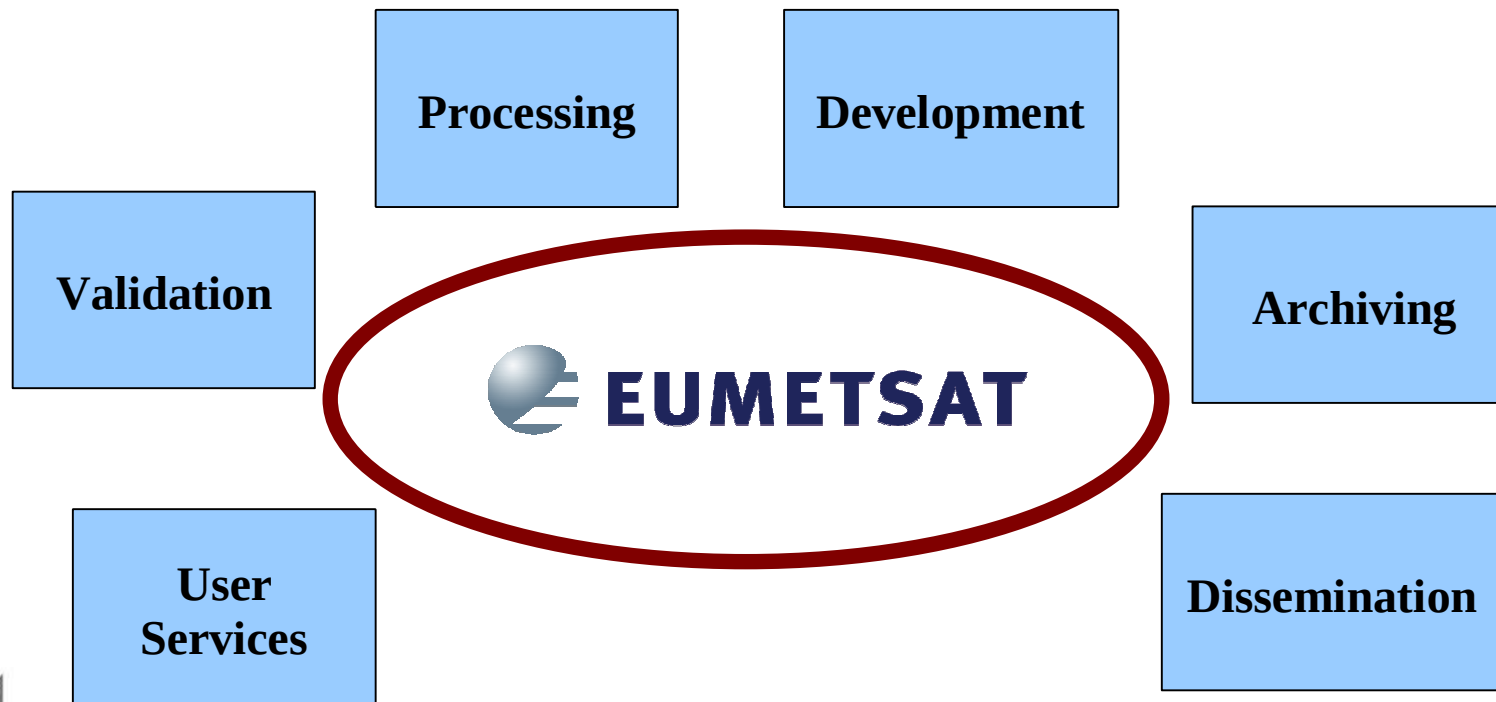


- EUMETSAT's Satellite Application Facilities
- Ozone and Atmospheric Chemistry Monitoring SAF
  - consortium
  - objectives and products
  - GOME-2 instrument
- Examples of O3M-SAF products
- Role of O3M-SAF for GMES services
- O3M-SAF data availability



## ***EUMETSAT's Satellite Application Facilities***

- SAFs are **dedicated centres of excellence** for processing satellite data
- Part of the distributed **EUMETSAT Application Ground Segment**
- **Consortia** of National Meteorological Services and research institutes



# *Ozone and Atmospheric Chemistry Monitoring SAF*



**Consortium:**  
 **EUMETSAT**



**11 Institutes  
7 Countries**



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 **O3M SAF**



# *Ozone and Atmospheric Chemistry Monitoring SAF*

## Objectives

- Operational Near Real Time (NRT) and Off-line products based on GOME-2 data

## Products and services

- Total ozone and minor trace gases ( $\text{NO}_2$ , BrO,  $\text{SO}_2$ , Formaldehyde, OClO,  $\text{H}_2\text{O}$ )
- Ozone profiles
- Aerosol properties (AAI, AOD, SSA)
- UV products (clear-sky and with clouds/albedo)
- Validation service for each product



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## GOME-2 instrument



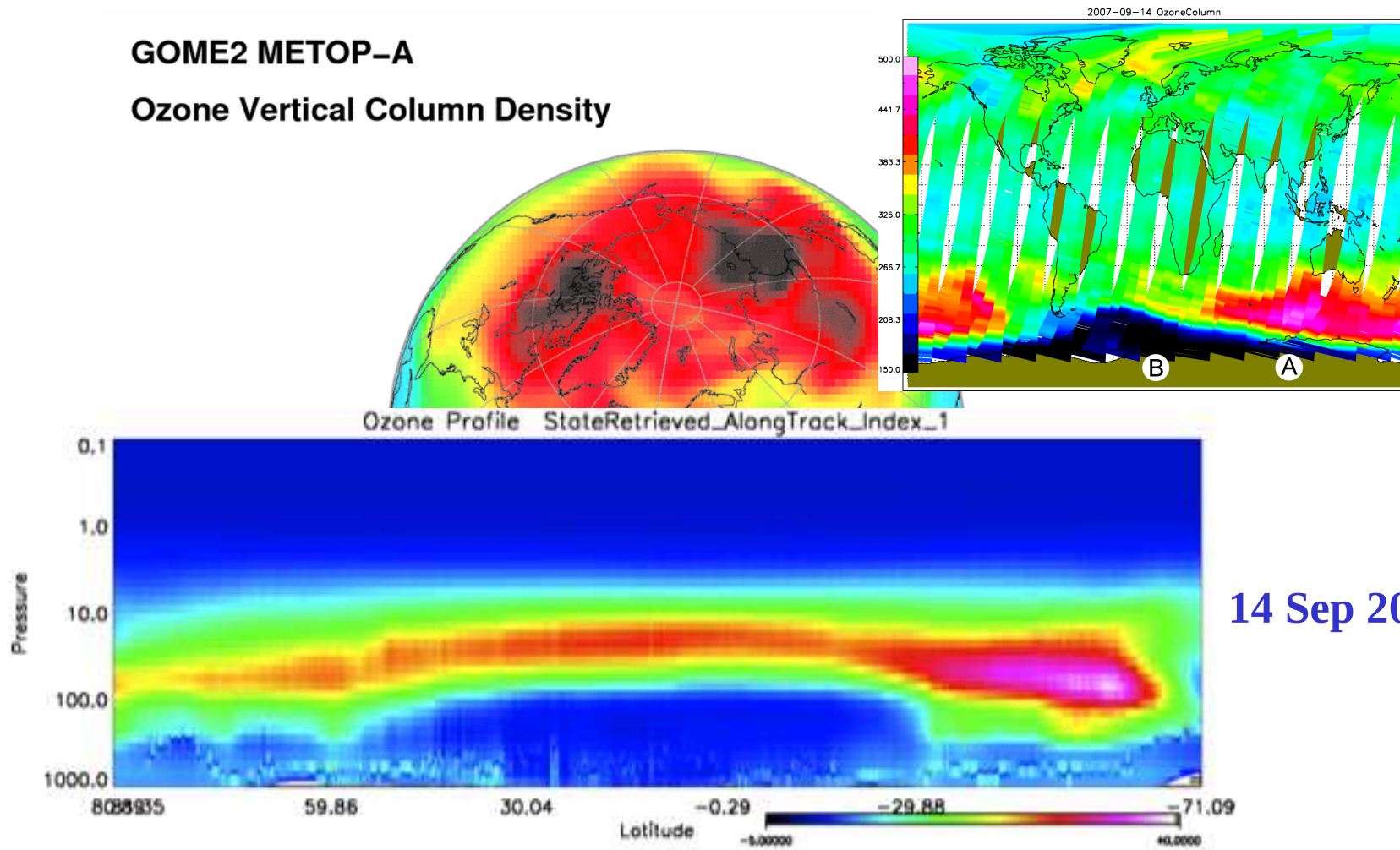
- GOME-2/MetOp-A is part of EUMETSAT Polar System (EPS)
  - MetOp-A launched: 19 Oct. 2006
  - GOME-2 products: Jan. 2007 - onwards
- GOME-2 spatial/temporal coverage
  - Orbit: sun-synchronous, 09:30h (descending node)
  - Spatial resolution: 80x40 km<sup>2</sup>
  - Global coverage in ~1.5 days
- EUMETSAT Polar System: three MetOp satellites (2006, 2012, 2016)
  - Continuous GOME-2 time-series from 2007-2020



## ***GOME-2: monitoring of the ozone layer***

**GOME2 METOP-A**

**Ozone Vertical Column Density**



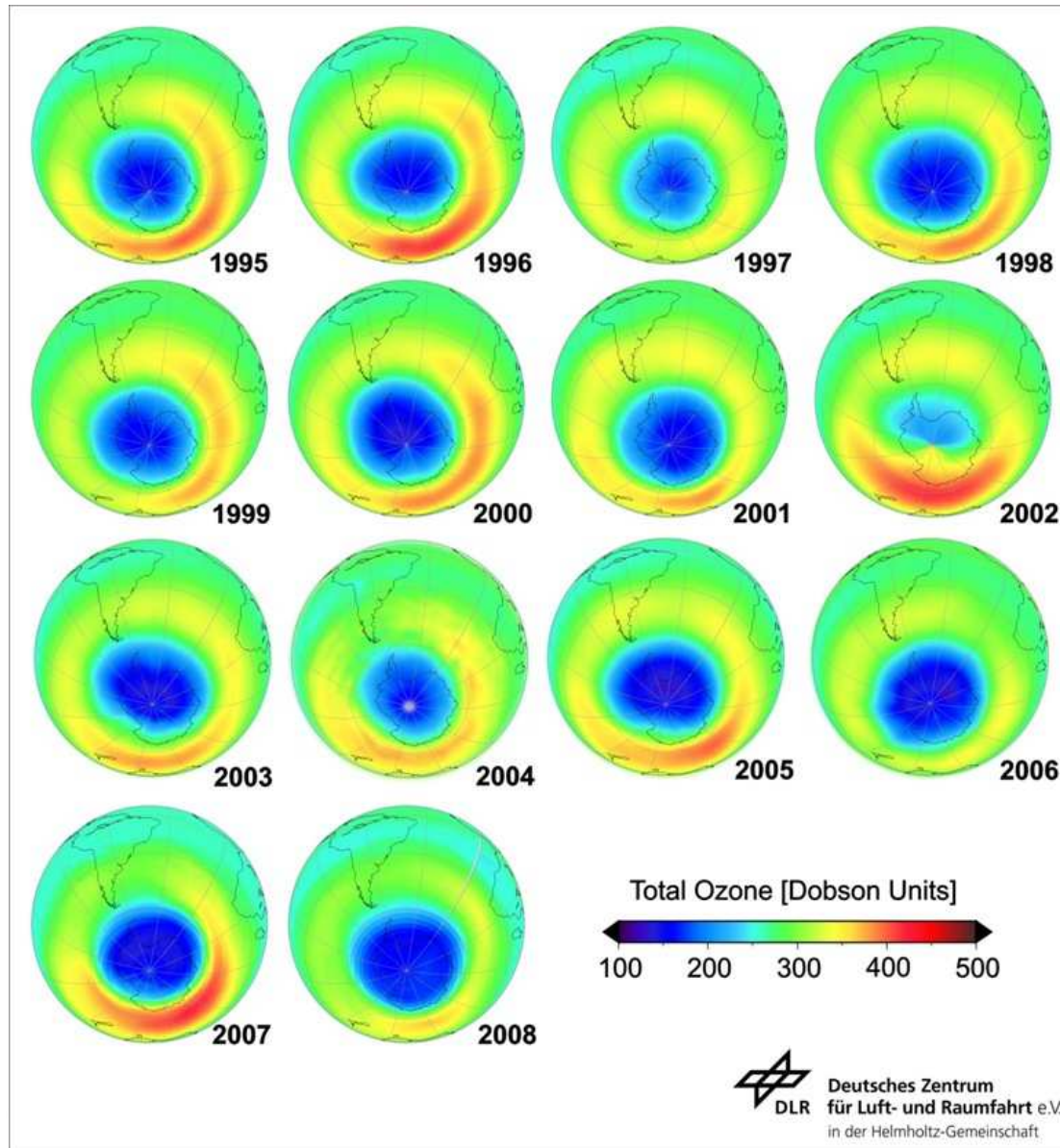
14 Sep 2007



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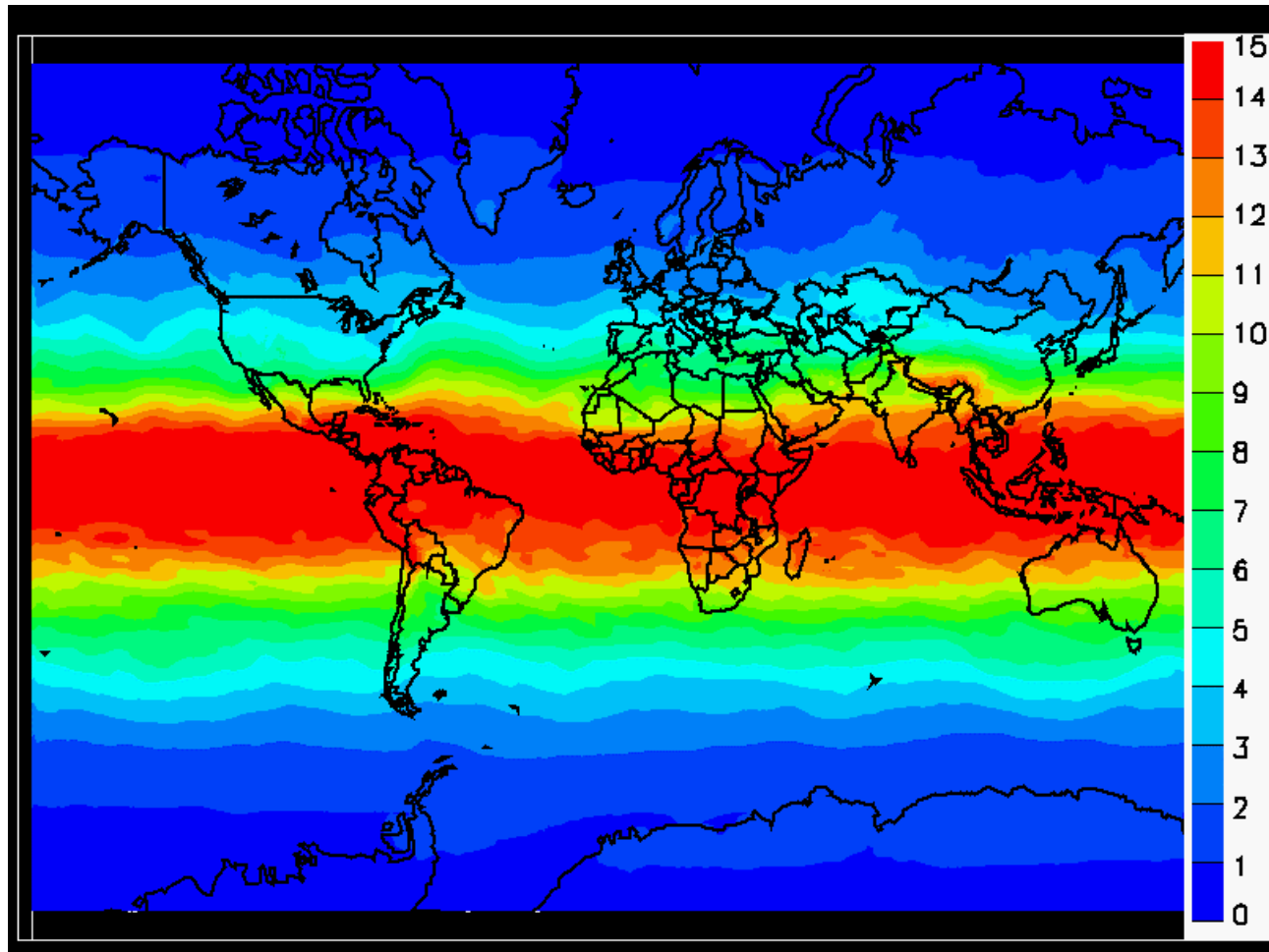
## Long time ozone data records from GOME and GOME-2



GOME/ERS-2:  
1995-2006

GOME-2/MetOp:  
2007 onwards

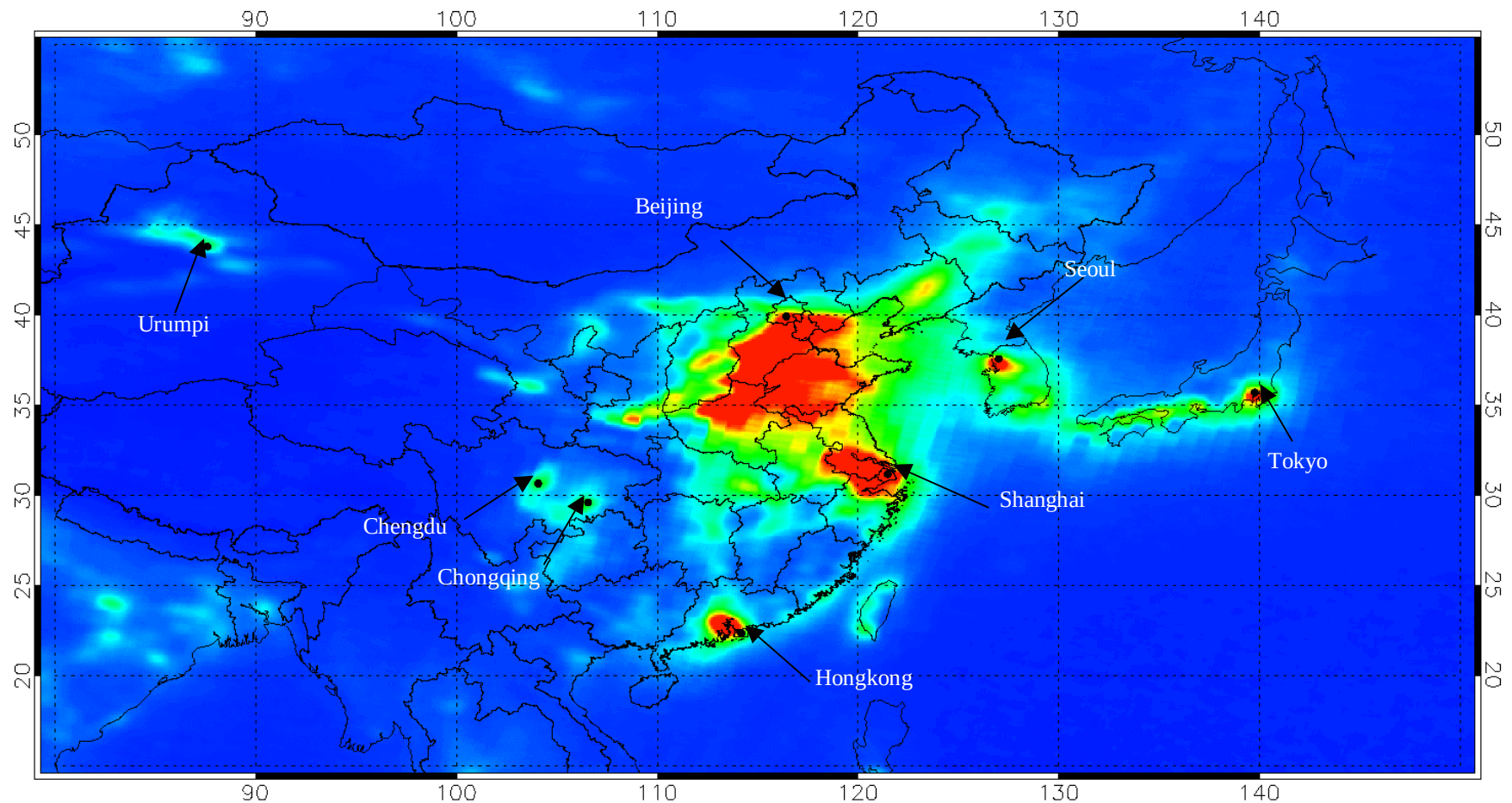
## *UV index (near real time)*



23 March 2010

# Air Quality monitoring: GOME-2 tropospheric NO<sub>2</sub>

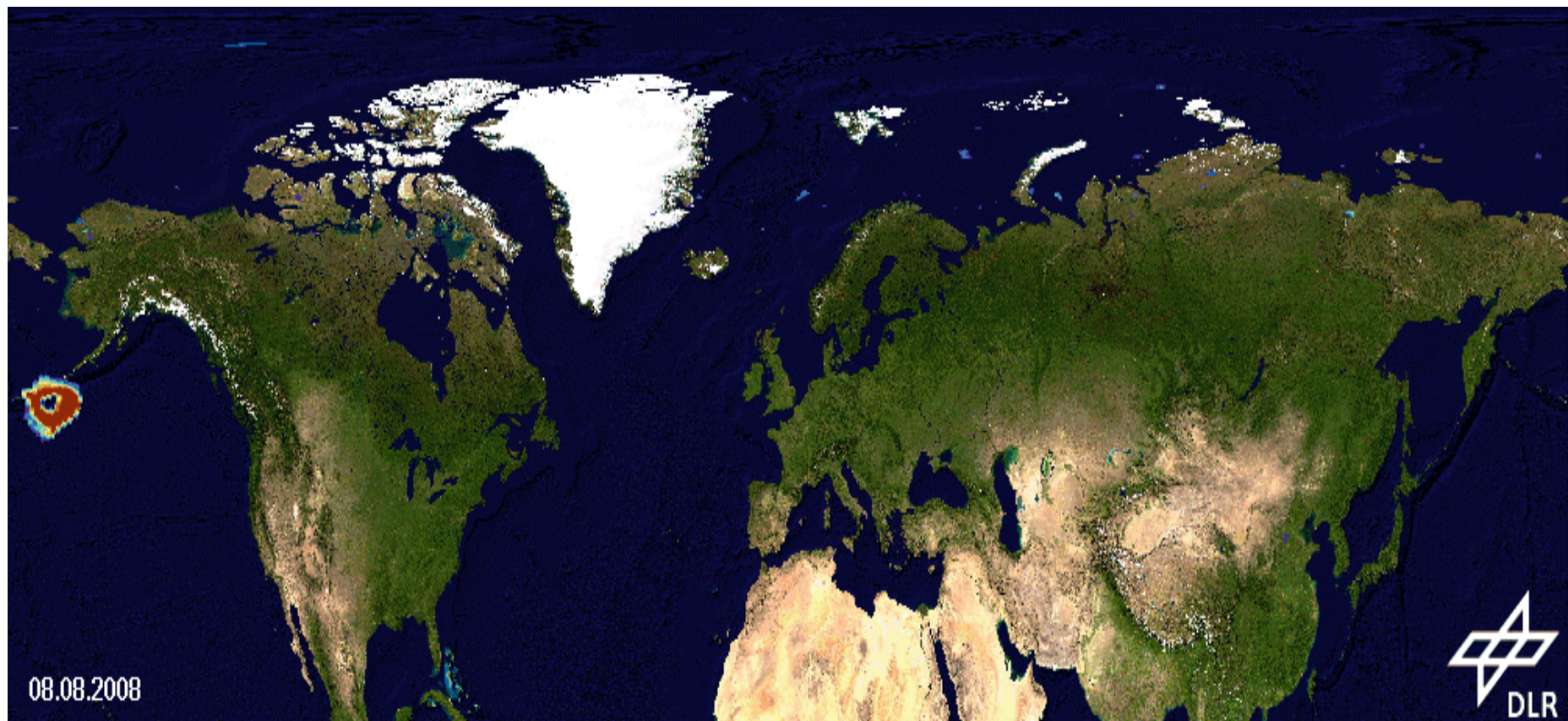
## 2007 - 2008



NO<sub>2</sub> column density [molec/cm<sup>2</sup>]

2.00e+14 2.31e+15 4.43e+15 6.54e+15 8.66e+15 1.08e+16 1.29e+16 1.50e+16

## *Early warning of volcanic hazards: GOME-2 SO<sub>2</sub>*



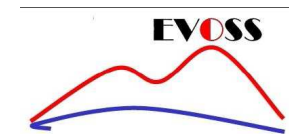
## Role of O3M-SAF for GMES services



O3M-SAF constitutes a reliable operational source of key atmospheric data

O3M-SAF products used in GMES core and downstream services

- **MACC** (Monitoring Atmospheric Composition and Climate)
  - **Atmospheric Core Service** (FP7)
    - air quality, climate forcing, stratospheric ozone and solar radiation
    - 45 partners (involving four EU-12 countries)
- **PASADOBLE** (Regional and local air quality services)
  - **Atmospheric Downstream Service** (FP7)
    - 21 partners (involving one EU-12 country)
- **EVOSS** (European Volcano Observatory Space Services)
  - **Emergency Response Downstream Service** (FP7)



Main meteorological O3M-SAF users

- **WMO, ECMWF, NOAA**



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## ***O3M-SAF data availability***

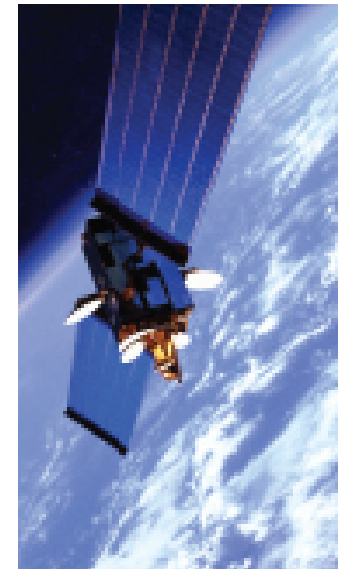


Near real time (NRT): available ~2 hours after sensing

- EUMETCast
  - Channel "SAF-Europe", satellite EUROBird 9 (9°E)
- WMO/GTS
- Dedicated FTP services
- Product data format: HDF5 and BUFR

Off-line (available after 2 to 14 days)

- EUMETSAT archive (UMARF)
- FMI and DLR/EOWEB archives
- Dedicated FTP services
- Product data format: HDF5



## Contacts



### O3M-SAF web-site

- Product overview
- Links to download O3M-SAF products
- Documentation
  - product user manuals, algorithm descriptions, validation reports
- Contact information

### Other web-sites

- [archive.eumetsat.int/umarf](http://archive.eumetsat.int/umarf)
  - EUMETSAT Data Centre
- [atmos.caf.dlr.de/gome2](http://atmos.caf.dlr.de/gome2)
  - Ozone and minor trace gas column products
- [uv-saf.dmi.dk](http://uv-saf.dmi.dk)
  - Near real time UV-index

Helpdesk: [o3msaf@fmi.fi](mailto:o3msaf@fmi.fi)



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