

# EPS/Metop Data Processing and Applications

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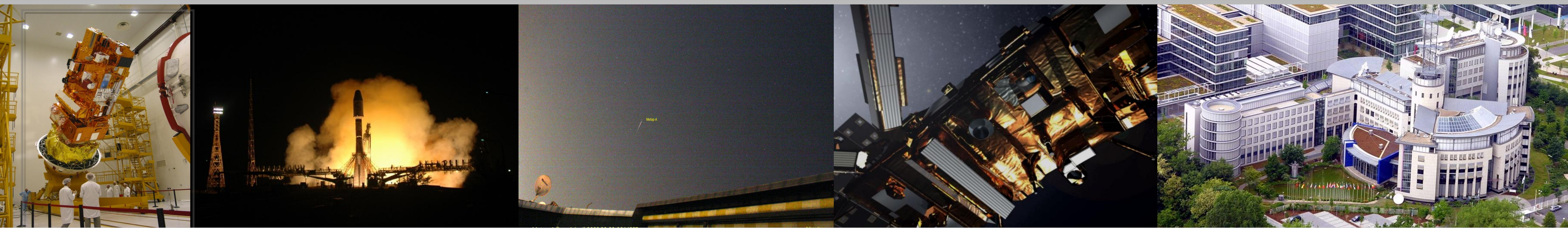


Table 1: Operational Product status

Product	Current Status	Future Status/Remark
AVHRR/3 Level 1	Operational	
AMSU-A Level 1	Operational	Channel 7 NeΔT out of specifications
MHS Level 1	Operational	
HIRS/4 Level 1	Operational	
IASI Level 1	Operational	
ASCAT Level 1	Operational	and reprocessed
GOME Level 1	Operational	and reprocessed
GRAS Level 1	Operational	
ATOVS Level 2	Operational	
IASI Level 2 twr, clp ozo, trg	Operational Demonstration	Validation ongoing

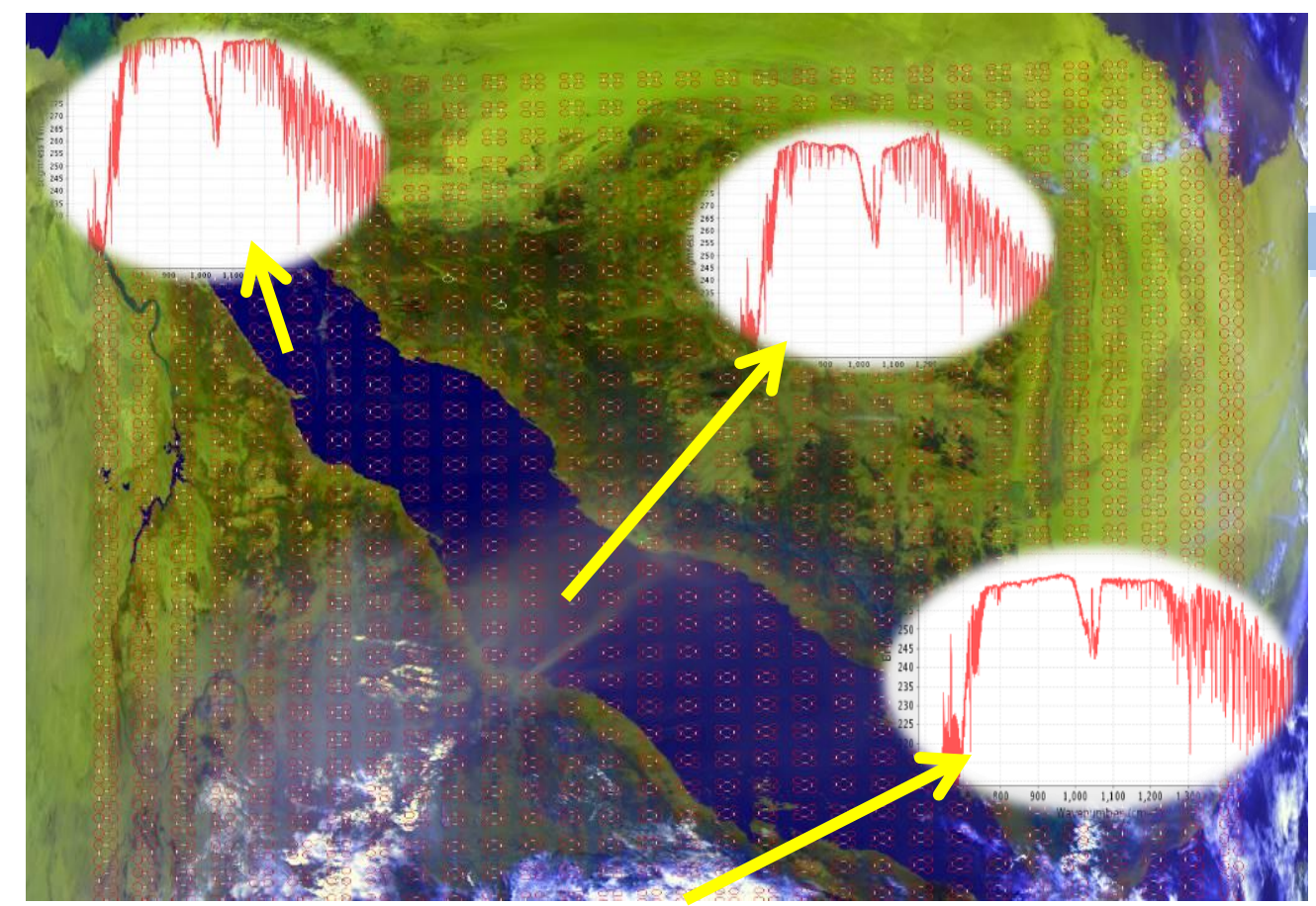


Figure 1: Selected IASI spectra on top of AVHRR RGB composite.

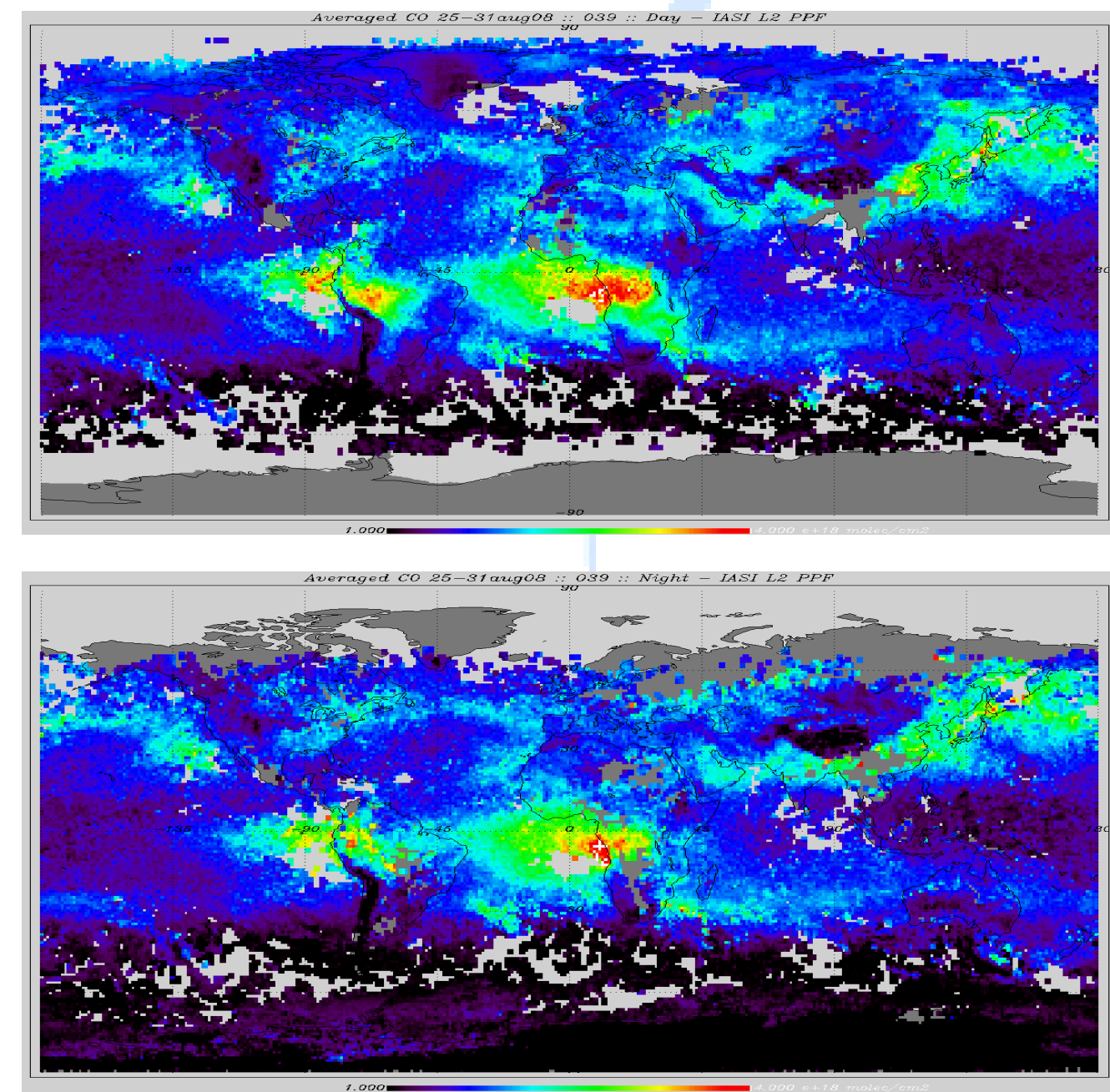


Figure 2: CO total columnar amount from IASI. Average 25-31 August 2008. Day (top) and Night (bottom).

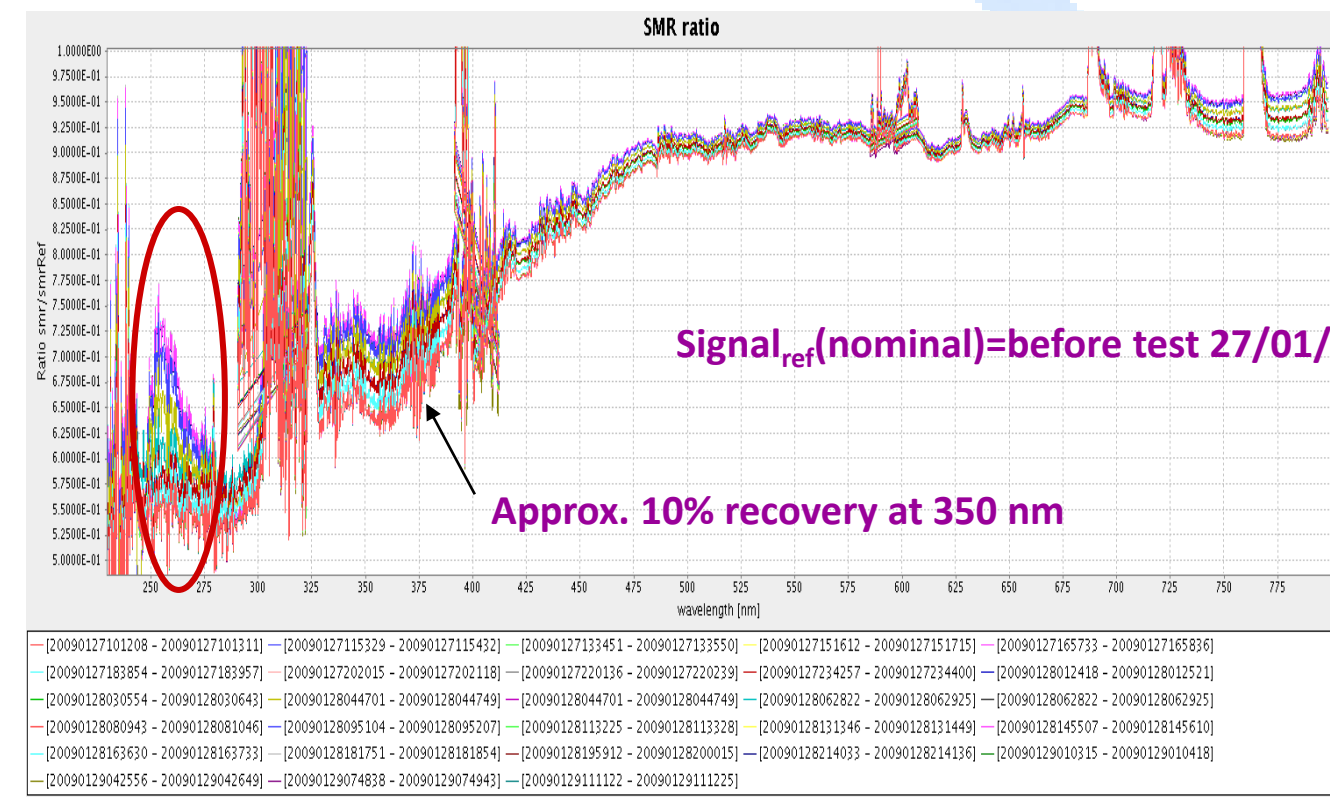


Figure 3: Example from the first GOME-2 throughput test. Ratio of Solar Mean reference Spectra before and after test.

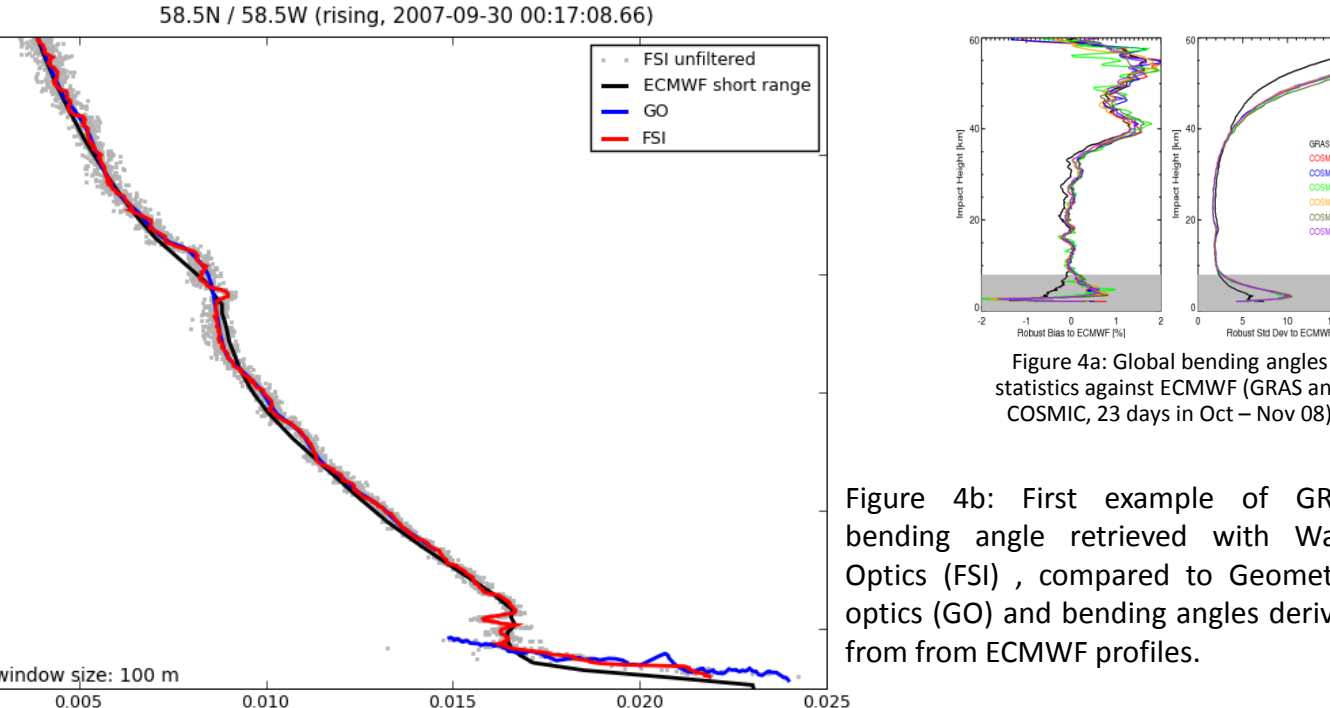
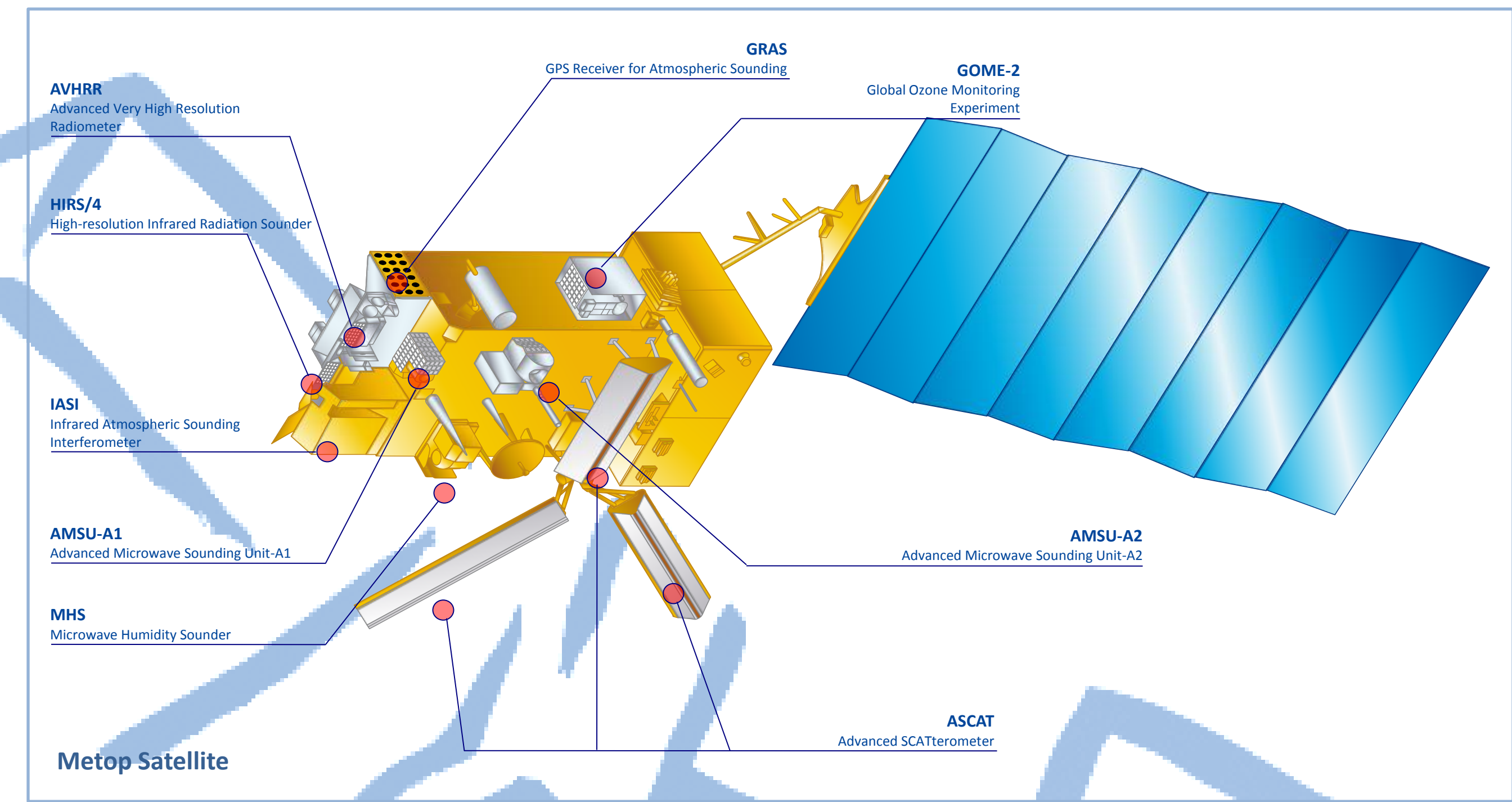


Figure 5: AVHRR RGB(324) colour composite of the Alps showing the snow situation in January 2010 (07January 2010, 0937 UTC).

## INTRODUCTION

The operational status of the EPS/Metop system is stable. Metop-A is now in space for more than 3 years and is continuously delivering data and products on a routine basis. The launch of Metop-B is now planned in the second quarter of 2012 from Baikonur .



## SYSTEM STATUS AND EVOLUTIONS

### Level 1 Products

The operational level 1 product services from ATOVS (AMSU-A, MHS, HIRS/4), AVHRR, IASI, GOME-2, ASCAT and GRAS have performed nominally with one exception: The AMSU-A channel 7 NeΔT went out of specification and was flagged accordingly in the product.

For IASI the mitigation for SEU (Single event Upsets) has been optimised by a software patch of the on-board software. This allows a shorter recovery time (some minutes instead of orbits outage) in case IASI is switched into Standby-Refuse mode.

ASCAT Normalisation Table Generation (NTG) was automated and implemented into operations. This can now handle orbital height changes automatically.

For GOME-2 Level 1 processing a number of tests and improvements were made:

- Degradation of the Quartz Tungsten Halogen Lamp (QTH) (Lamp blackening)
- A patch to solve the co-adding problem (registration error of the ground pixel location when compared without co-adding) was implemented on-board.
- GOME-2 throughput : Two tests were conducted in 2009 to investigate the loss of throughput . The analysis of the results is ongoing.

Considerable progress has been made in the GRAS level 1 processing. A prototype processor for the open loop and wave optics processing was available at the end of 2009 and its settings are currently optimised. After this a transition of the new processor to operations is foreseen.

### Level 2 Products

The Level 2 operational products, ASCAT Soil Moisture, ATOVS and IASI retrievals, have continued nominally. Continuous improvement of all products is being worked at.

The IASI CO retrieval algorithm was updated and an improved total columnar CO retrieval was delivered in May 2009. IASI trace gas products are currently being externally validated, namely CO and O<sub>3</sub> total columns through a study by LATMOS.

### Day-2 Products

- The agreed set of products for which development activities have taken place in 2008 and 2009 are:
- Global Soil Moisture from ASCAT
  - Global Normalised Differential Vegetation Index (NDVI) from full resolution AVHRR on Metop at the top of atmosphere (TOA)
  - Polar Cap Winds from AVHRR.

The Global Soil Moisture product from ASCAT has become operational in December 2008.

The NDVI development was finalised in early 2008 and the product was implemented within the operational AVHRR product Processing Facility (PPF). The trial dissemination has started end August 2009. Meanwhile the users have requested the top of canopy (TOC) NDVI, i.e. an NDVI product corrected for atmospheric and aerosol effects. The required further development is pending.

Concerning Polar Cap winds from AVHRR, the development has progressed considerably in cooperation with NOAA/NESDIS/CIMSS. A prototype processor and associated test data have been delivered end 2008. IASI information can be used in the height assignment process. A dataset of one month (January 2009) of AVHRR Polar Cap Winds with and without IASI height assignment was made available in March 2009 for evaluation. The implementation into operations is ongoing and trial dissemination is expected in the first half of 2010.

## OUTLOOK

Metop-A is providing stable and reliable services for more than 3 years in orbit. Regular analysis of the satellite and its instruments are made and currently led to a launch date of Metop-B of April 2012. Both spacecraft will fly in the same mid-morning orbit (9:30 MLST descending node) phased by about 48 min.

Table 2: Day-2 Product status

Day-2 Product	Current Status	Future Status/Remark
ASCAT Soil Moisture	Operational	Since December 2008
AHRRR Full Resolution Normalised Differential Vegetation Index (TOA)	Trial Dissemination	Since September 2009 Upgrade to TOC NDVI pending
AVHRR derived Polar Cap Winds	Development finished Being implemented	Trial dissemination expected first half 2010

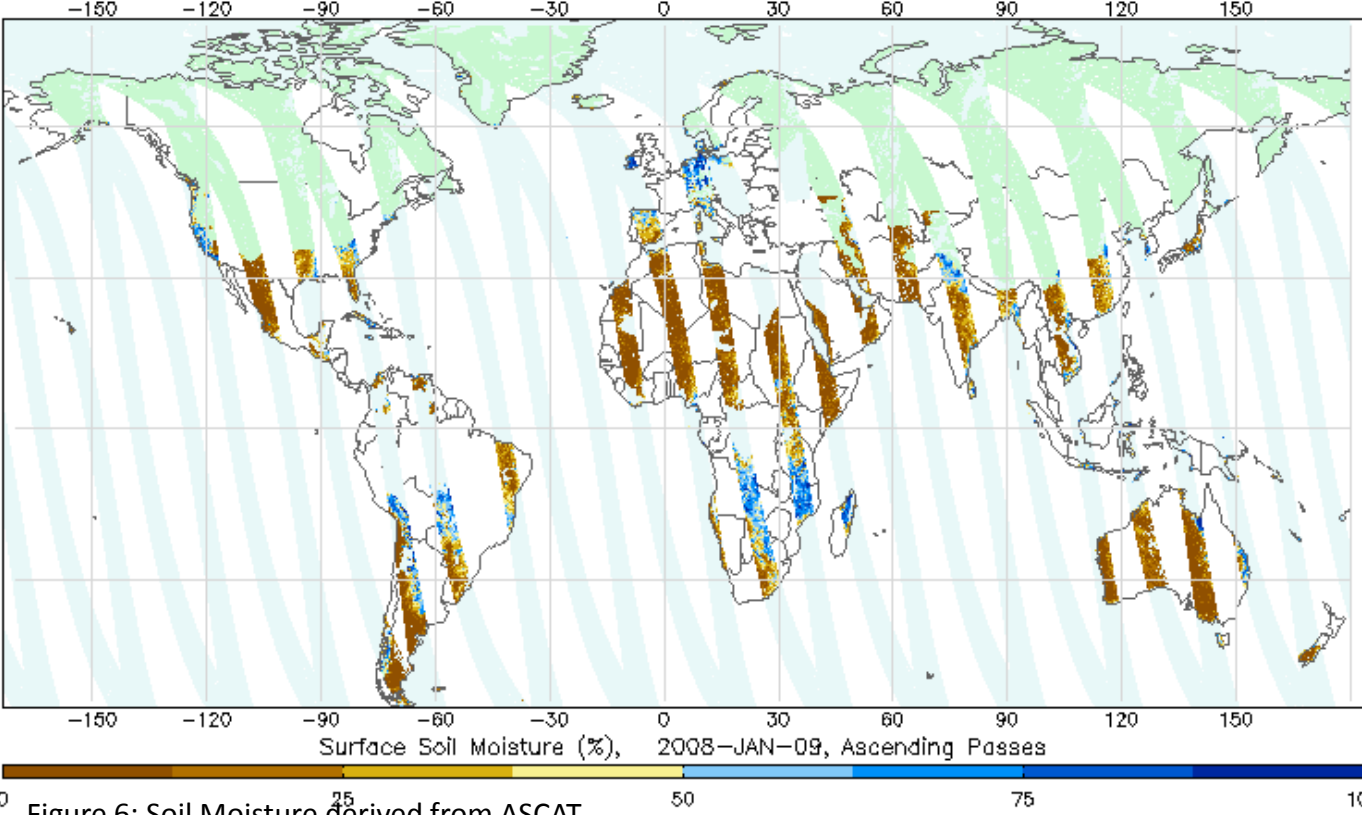


Figure 6: Soil Moisture derived from ASCAT.

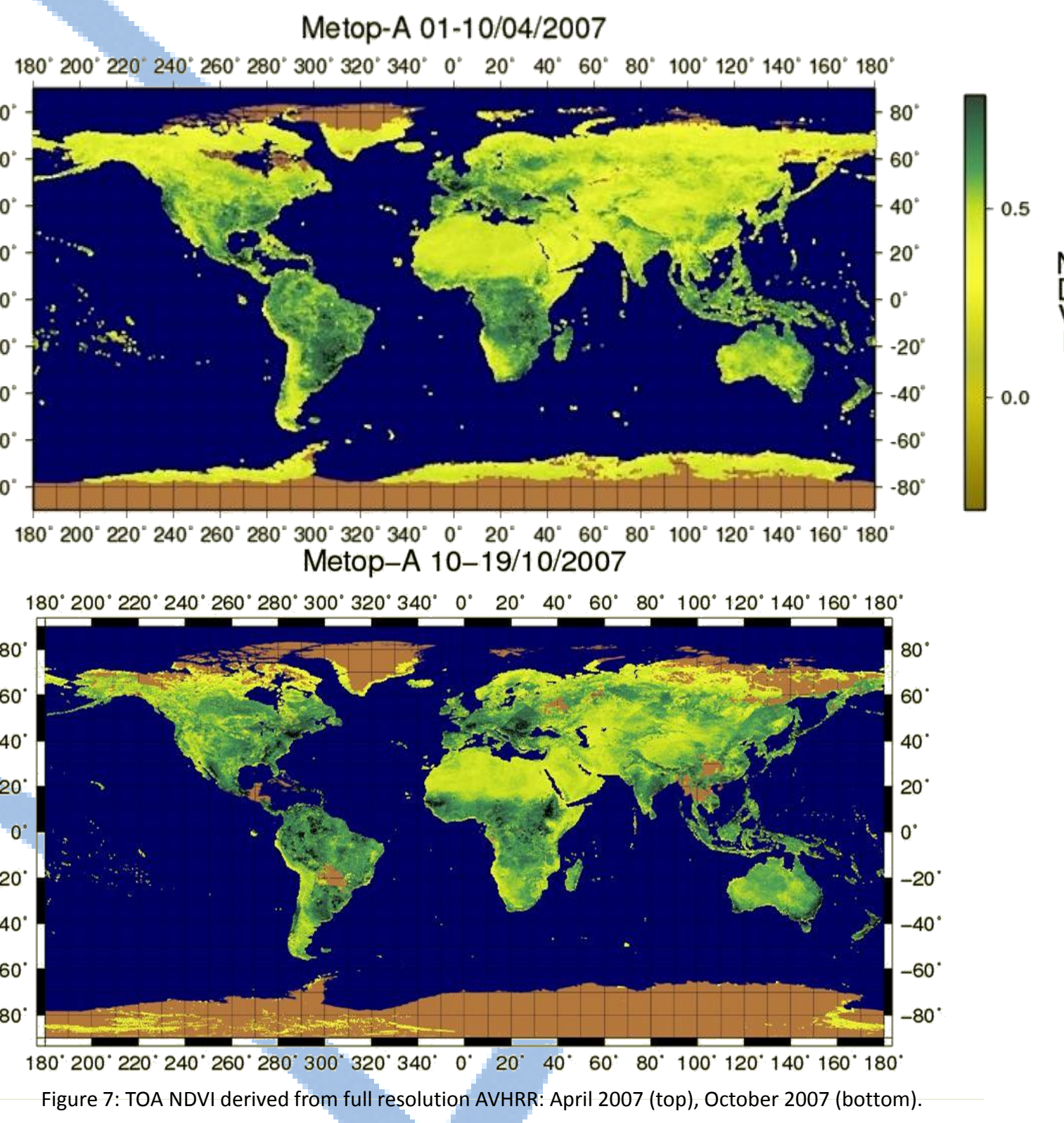


Figure 7: TOA NDVI derived from full resolution AVHRR: April 2007 (top), October 2007 (bottom).

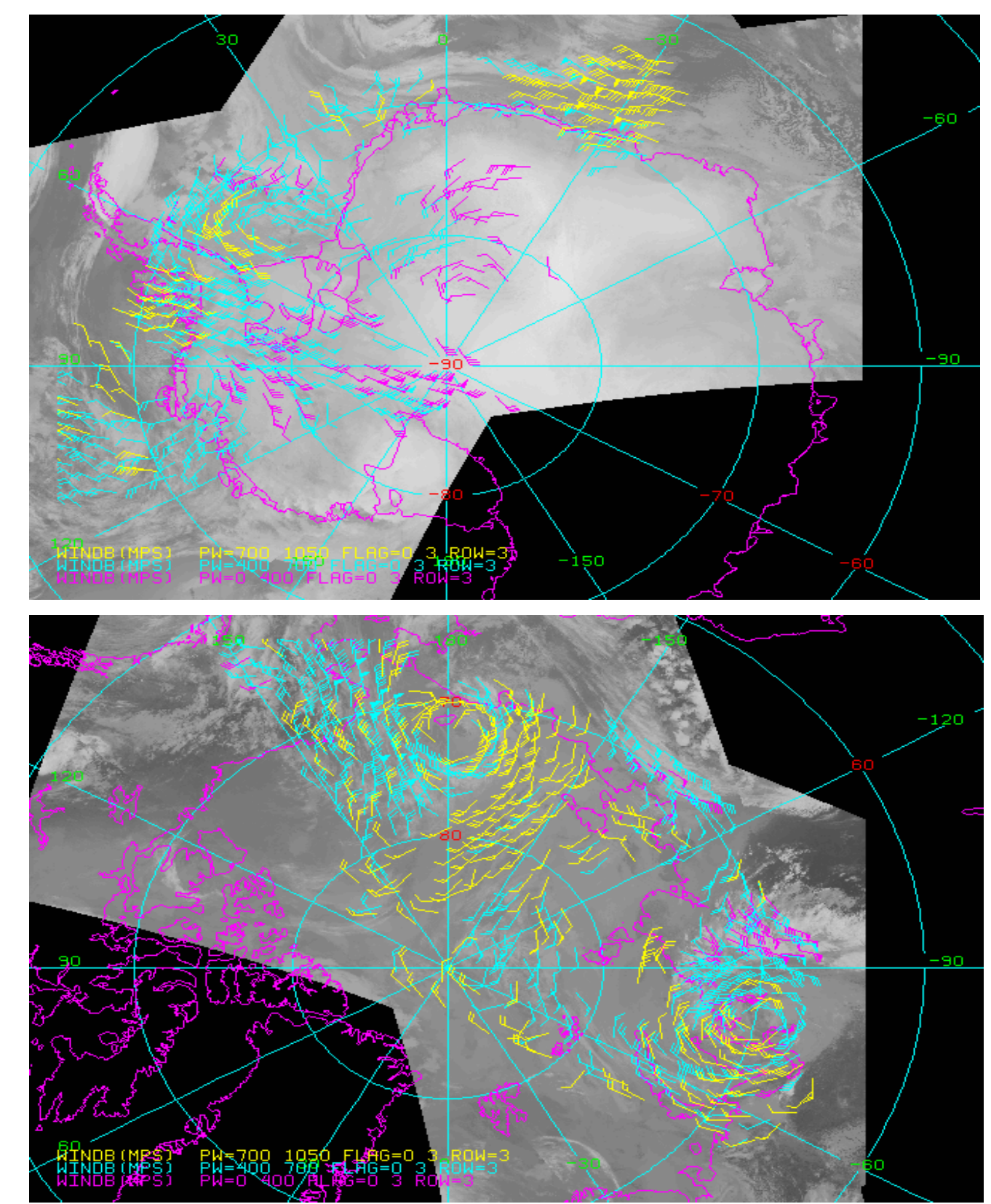
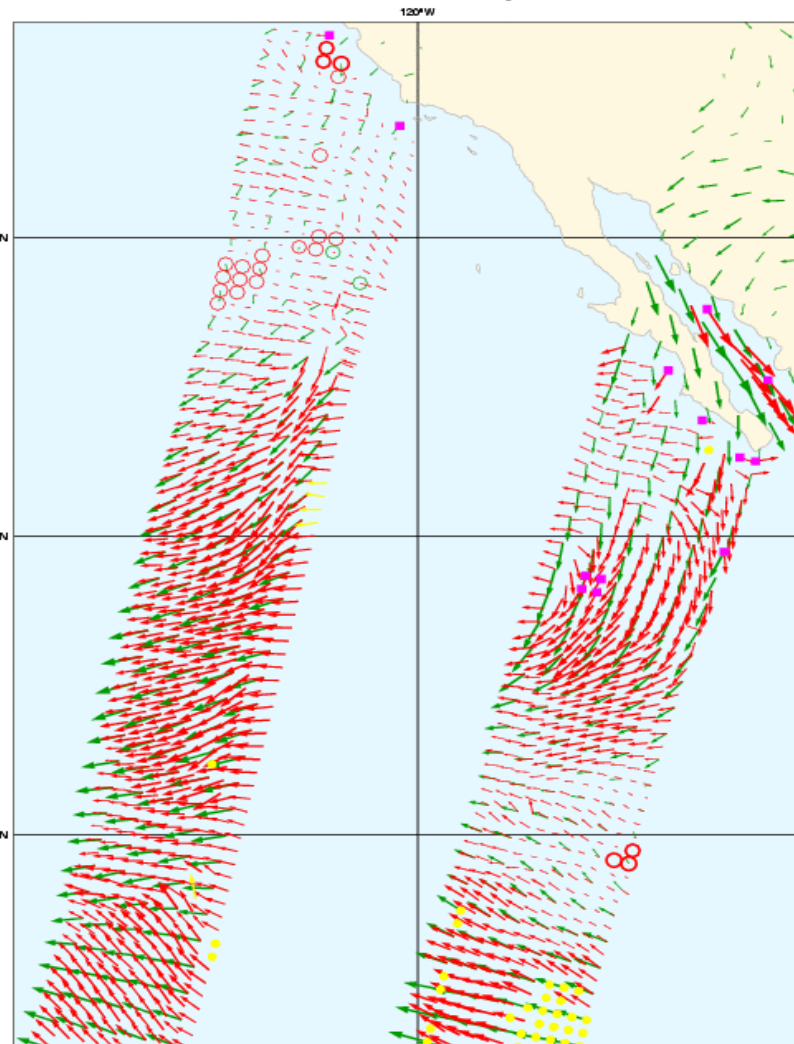


Figure 8: AVHRR derived Polar Cap Winds over the Antarctic (top) and the Arctic (bottom).

Figure 9: ASCAT derived winds from KNMI (OSI SAF). ASCAT: 20061027 17:30Z lat lon: 20.00 -120.00



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