



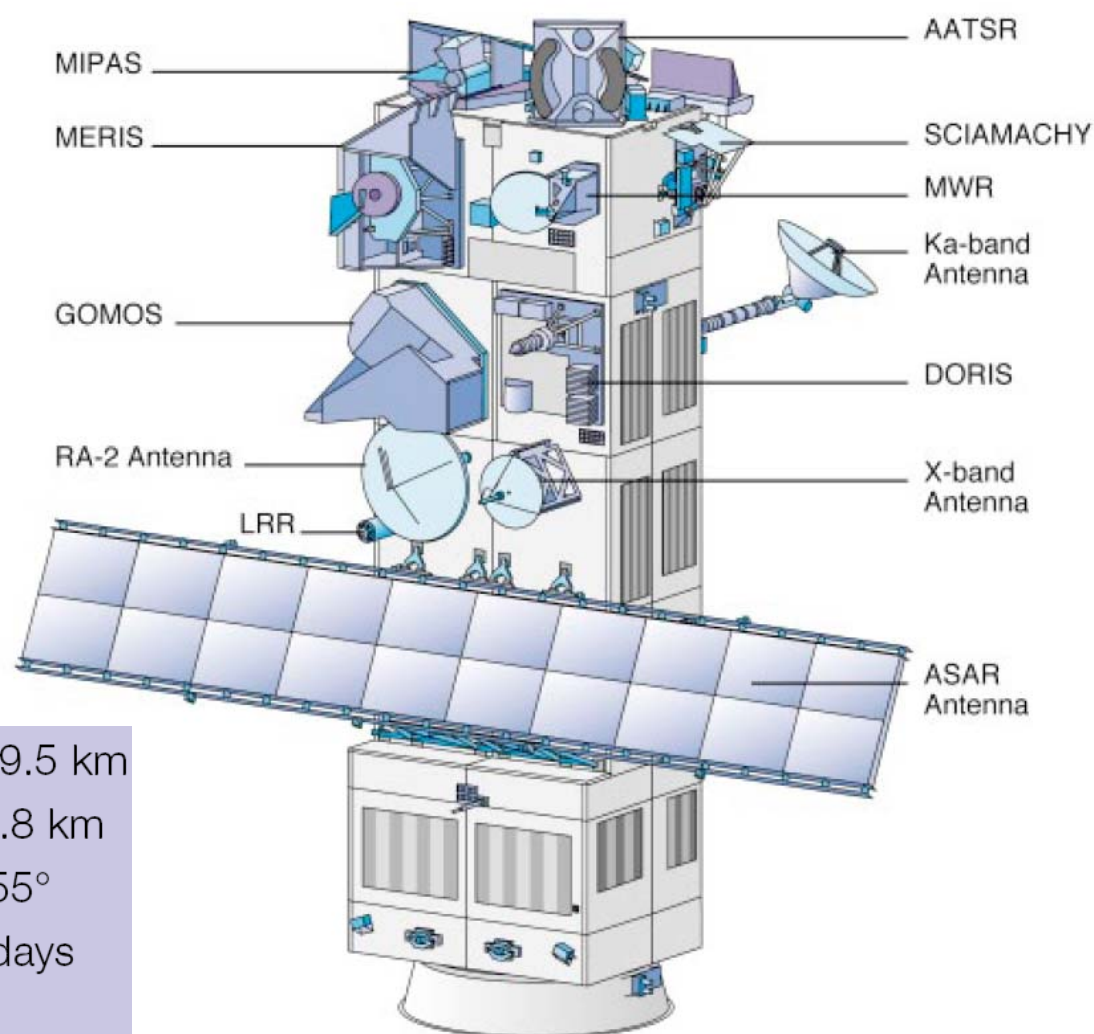
# MERIS instrument

Jose Moreno

4 September 2007, D2L3-1



# ENVISAT MISSION



Semi-major axis:	7159.5 km
Mean altitude:	799.8 km
Inclination:	98.55°
Repeat cycle:	35 days
No. of orbits in 1 cycle:	501
Reference ascend. node:	0.1335° E
Desc. node mean local solar time:	10.00



## **MERIS (MEdium Resolution Image Spectrometer) Instrument**

**MERIS is a programmable, medium-spectral resolution, imaging spectrometer operating in the solar reflective spectral range. Fifteen spectral bands can be selected by ground command, in the range 390 nm to 1040 nm (bandwidth programmable between 2.5 and 30 nm).**

**The instrument scans the Earth's surface by the so called "push-broom" method. Linear CCD arrays provide spatial sampling in the across-track direction, while the satellite's motion provides scanning in the along-track direction.**

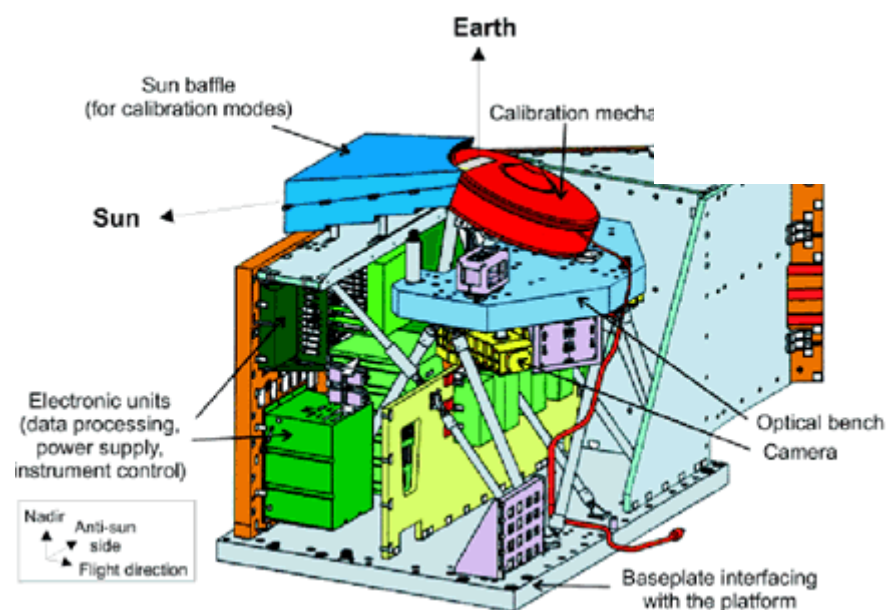
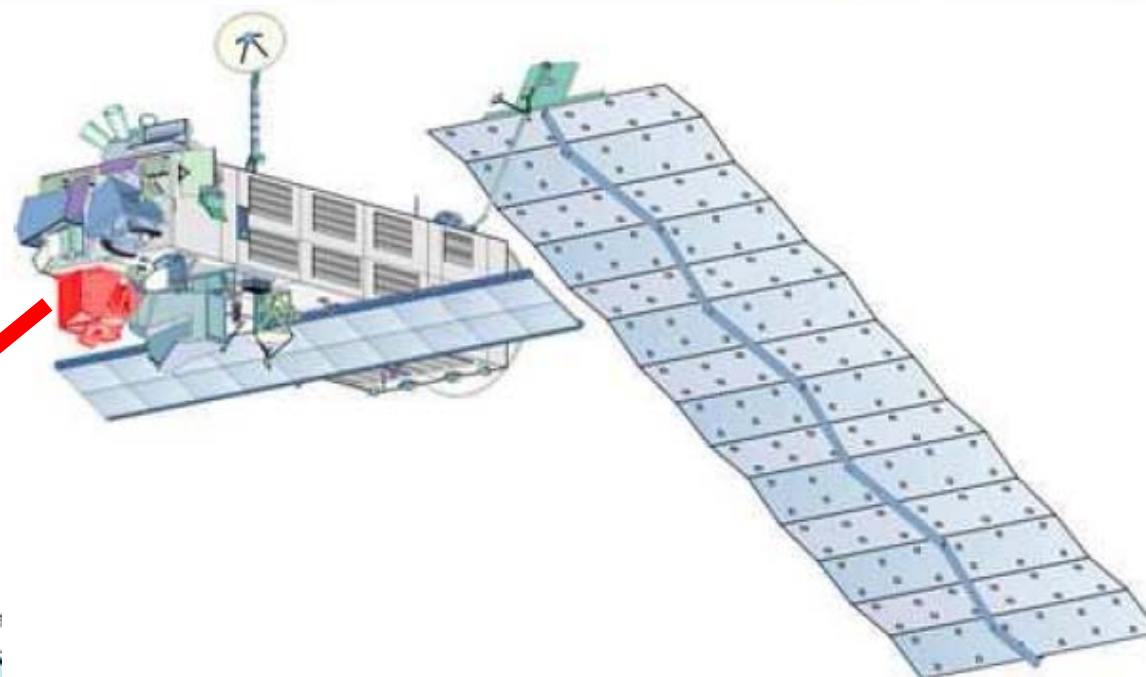
**MERIS is designed so that it can acquire data over the Earth whenever illumination conditions are suitable. The instrument's 68.5° field of view around nadir covers a swath width of 1150 km. This wide field of view is shared between five identical optical modules arranged in a fan shape configuration, providing global coverage every 3 days.**

**Full resolution: 260m x 300m**

**Reduced resolution: 1040m x 1200 m (on-board spatial degradation)**

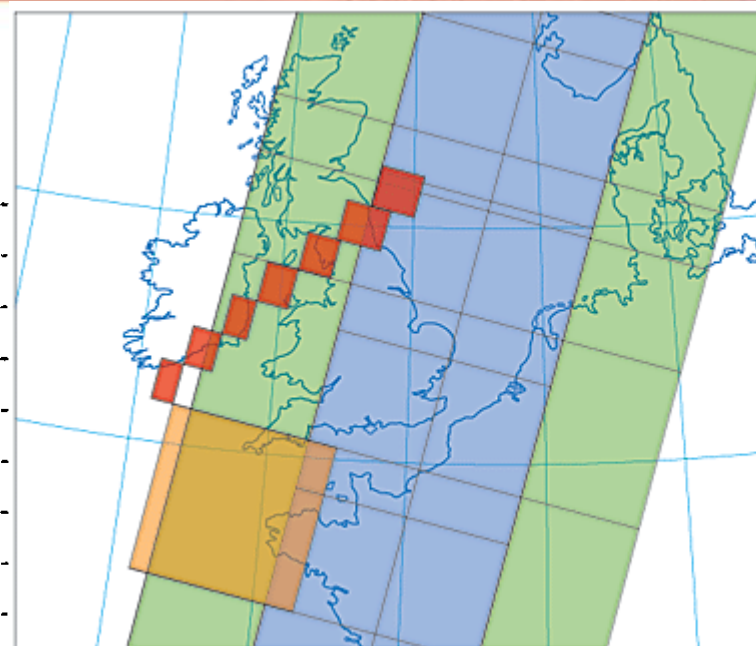
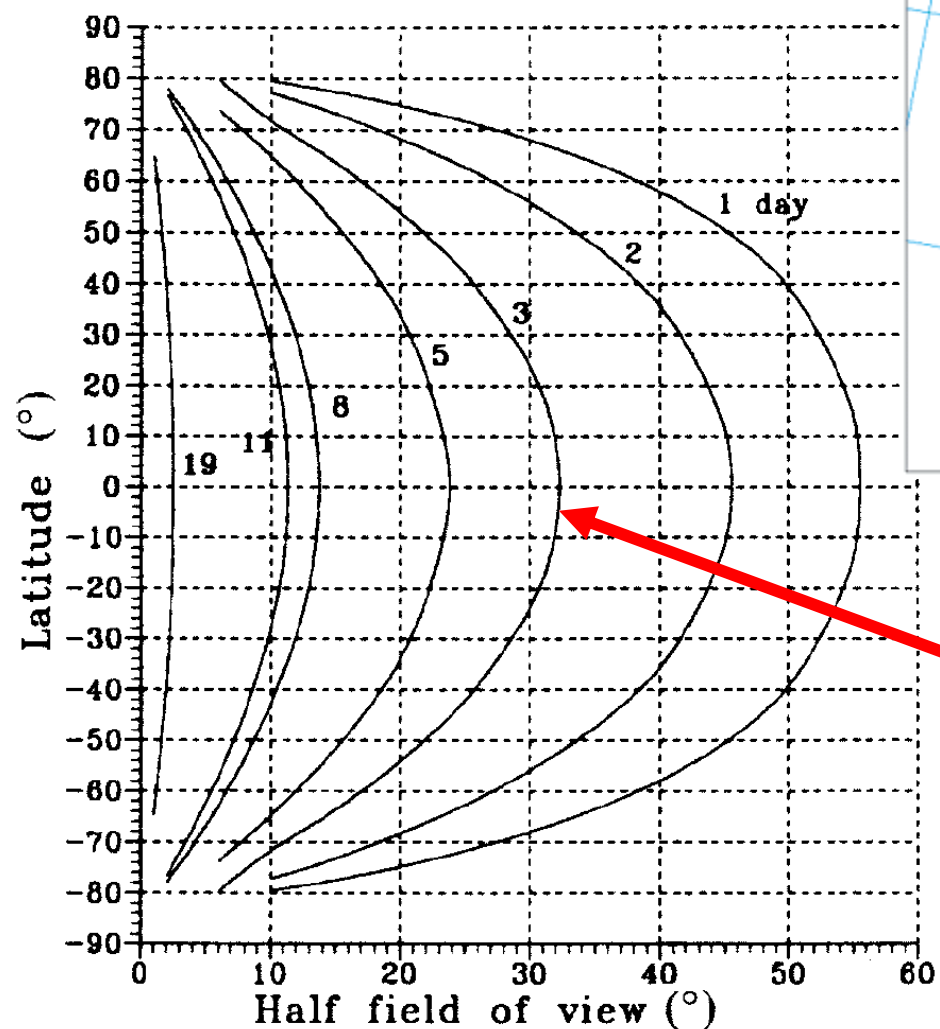


# ENVISAT

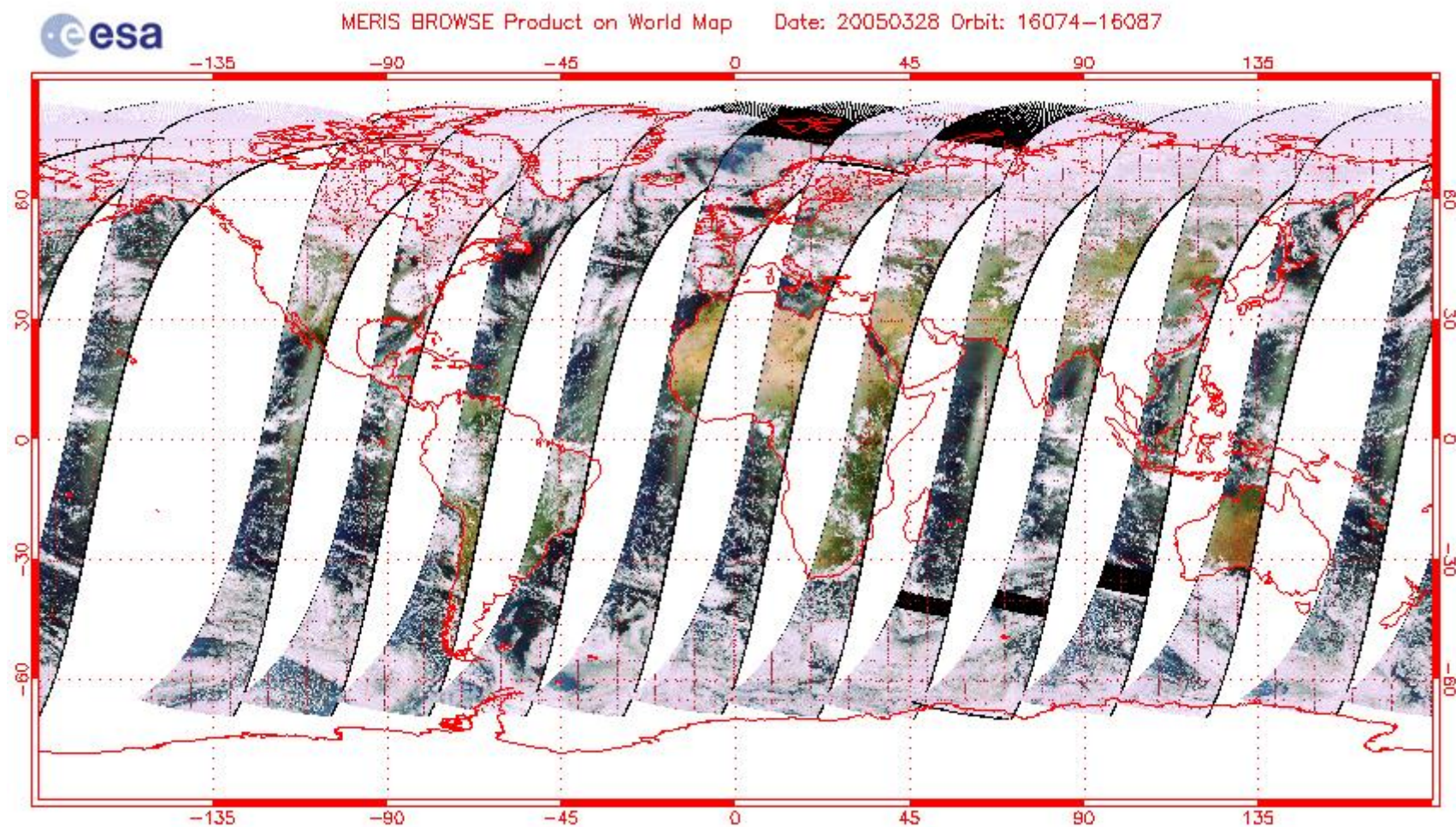


# MERIS

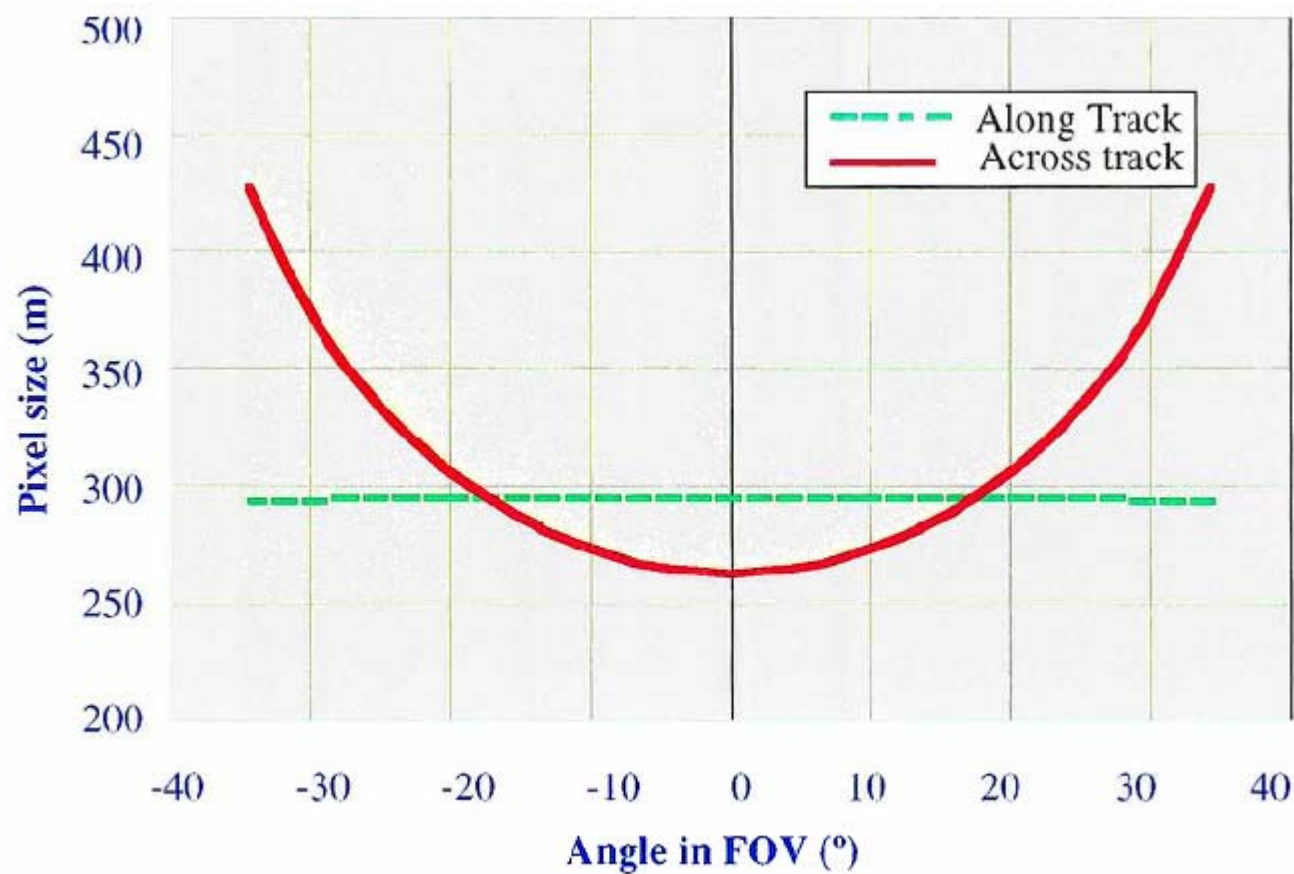




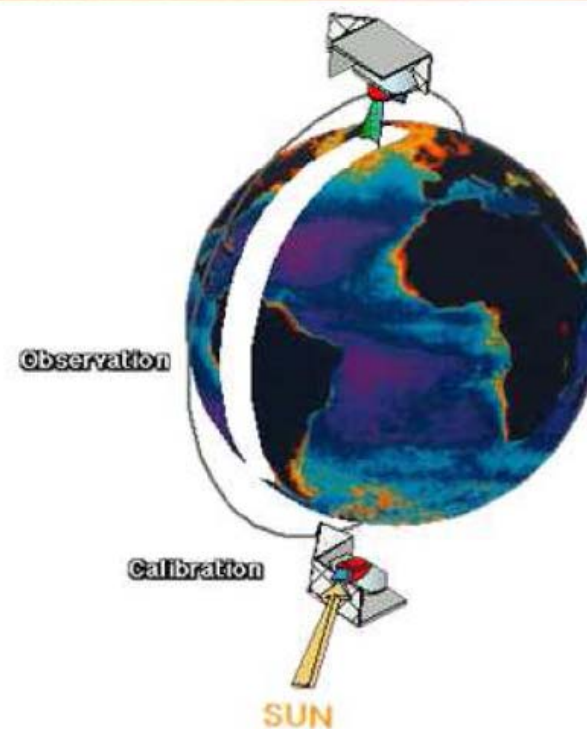
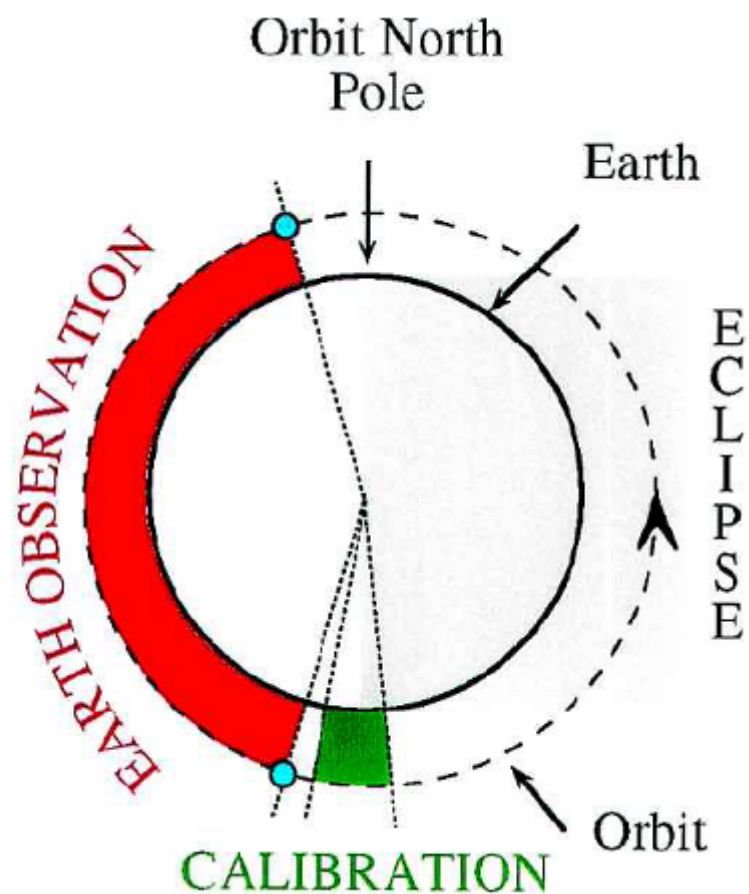
- ASAR Image
- Wide Swath
- AATSR
- MERIS



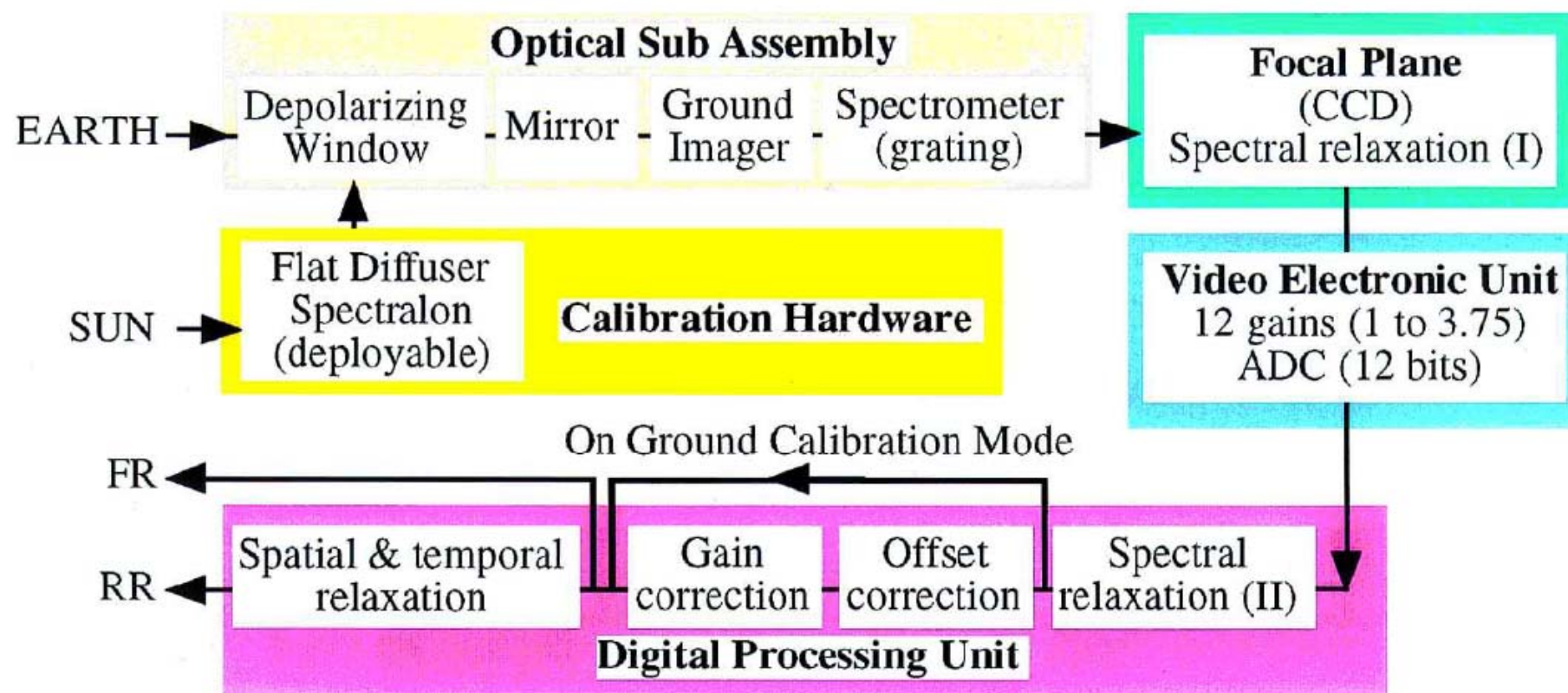




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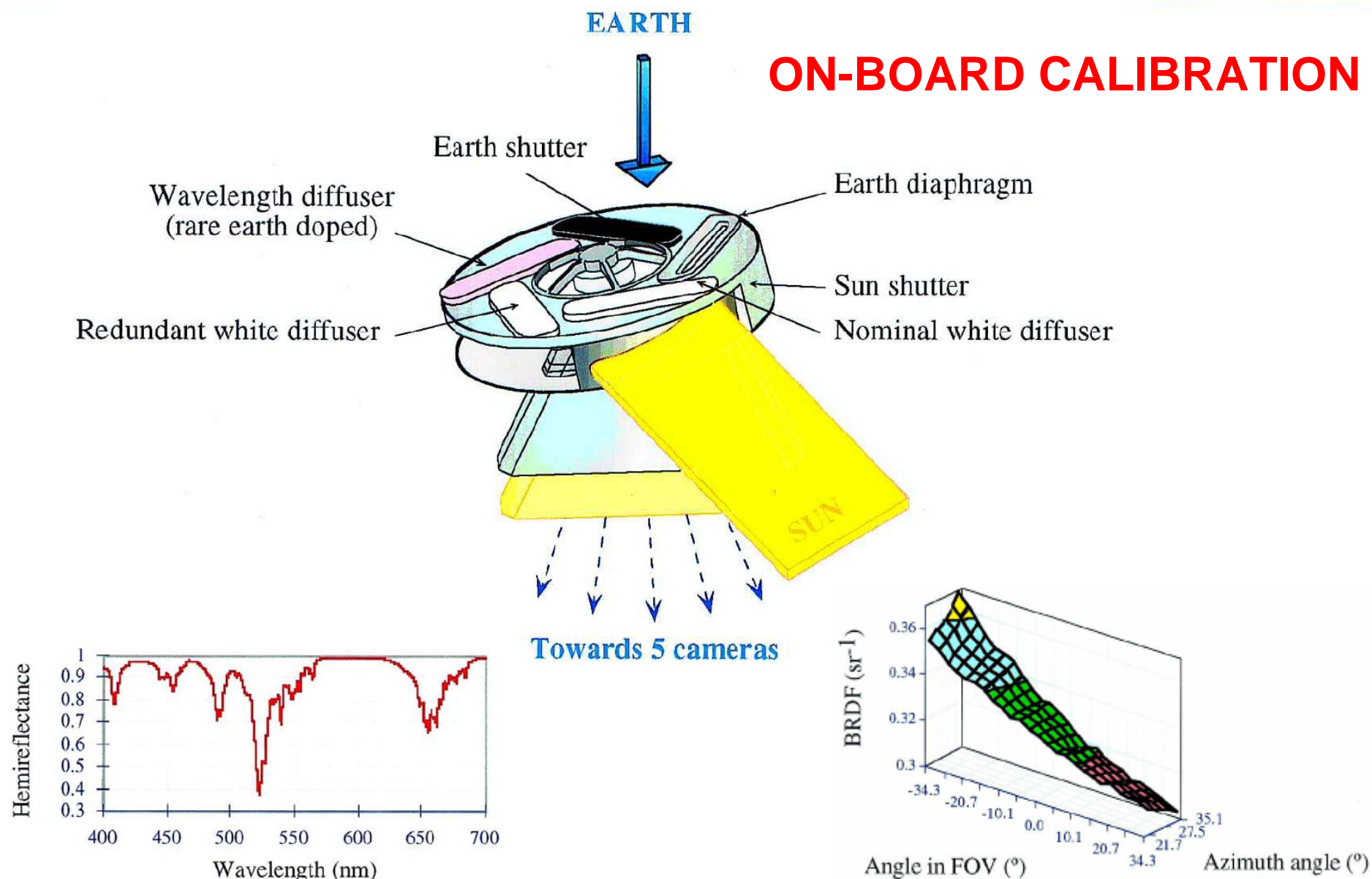


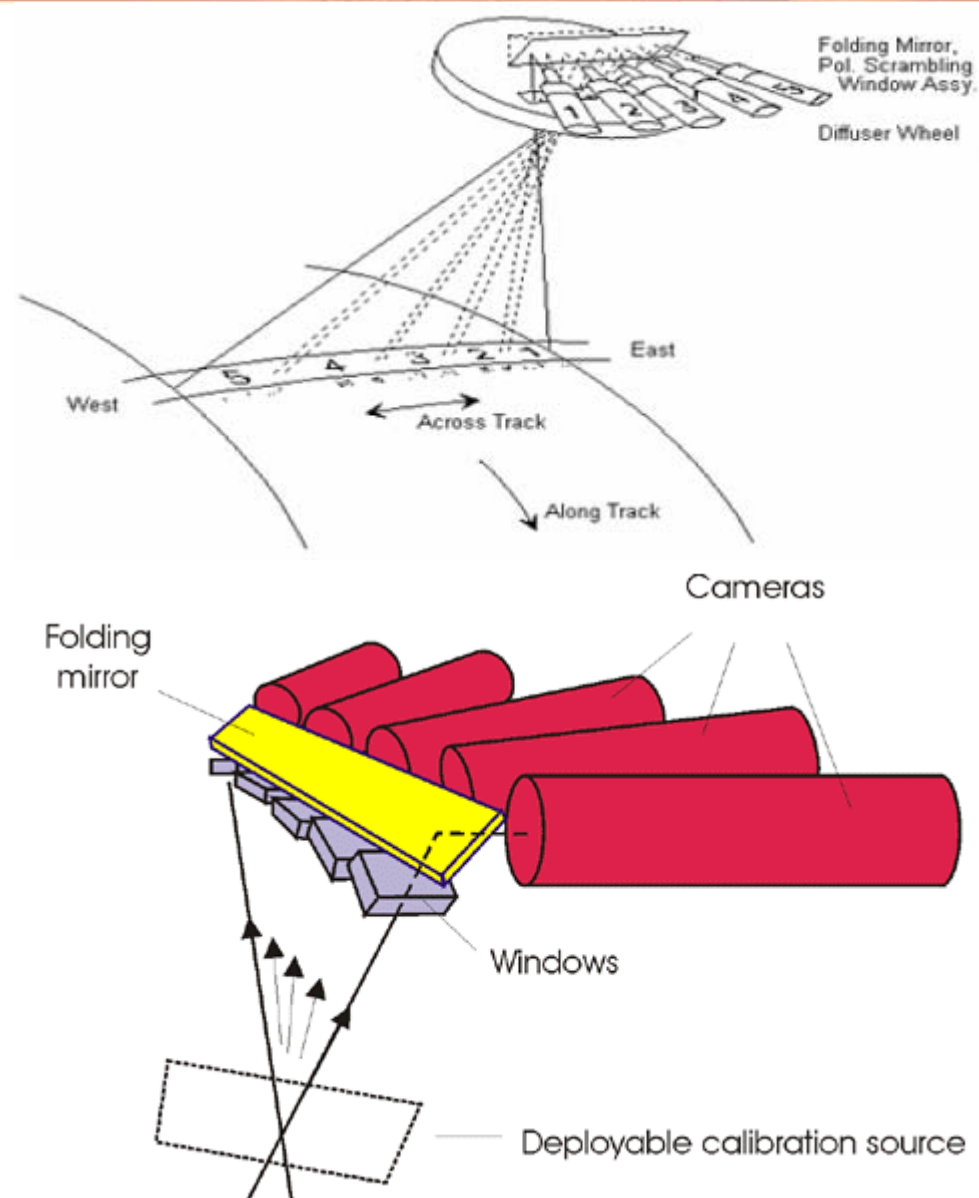
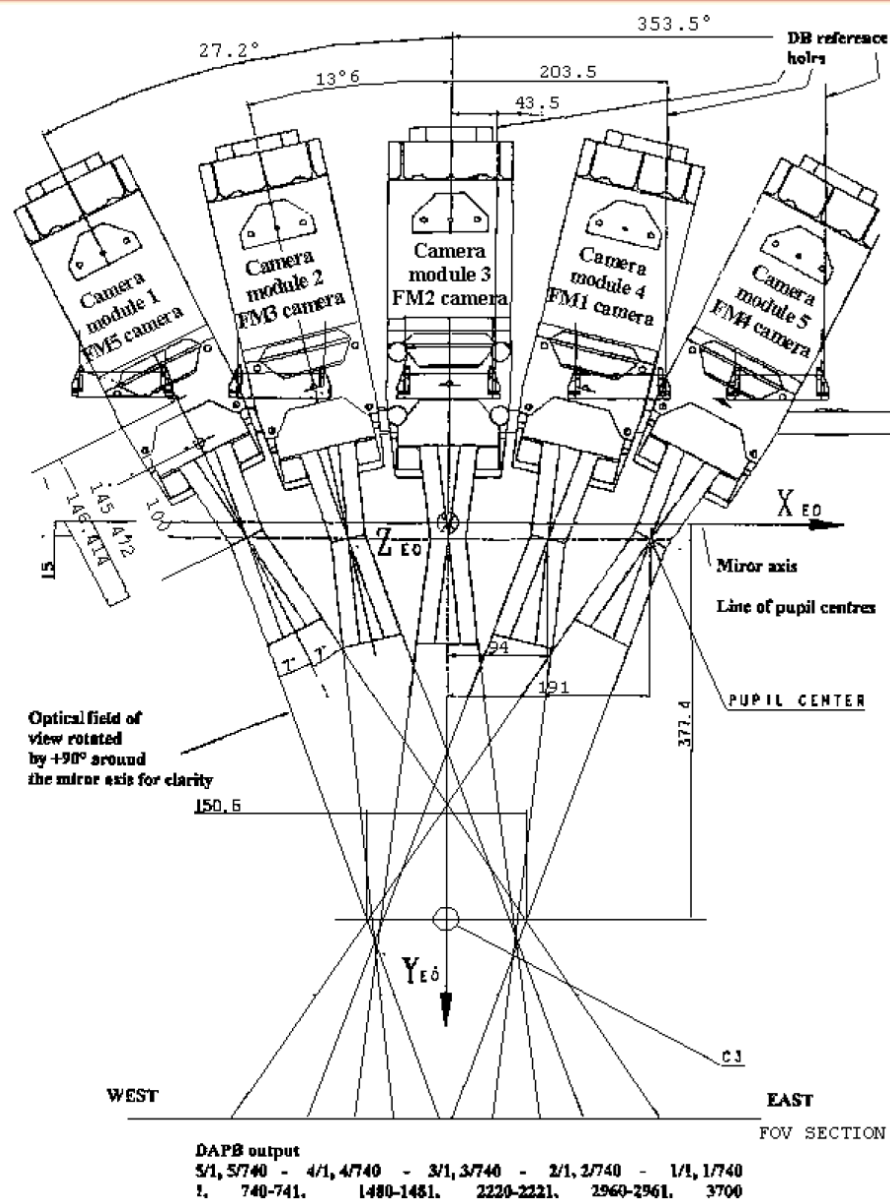
FR = Full Resolution data (260 m x 300 m at nadir)

RR = Reduced Resolution data (1040 m x 1200 m at nadir)

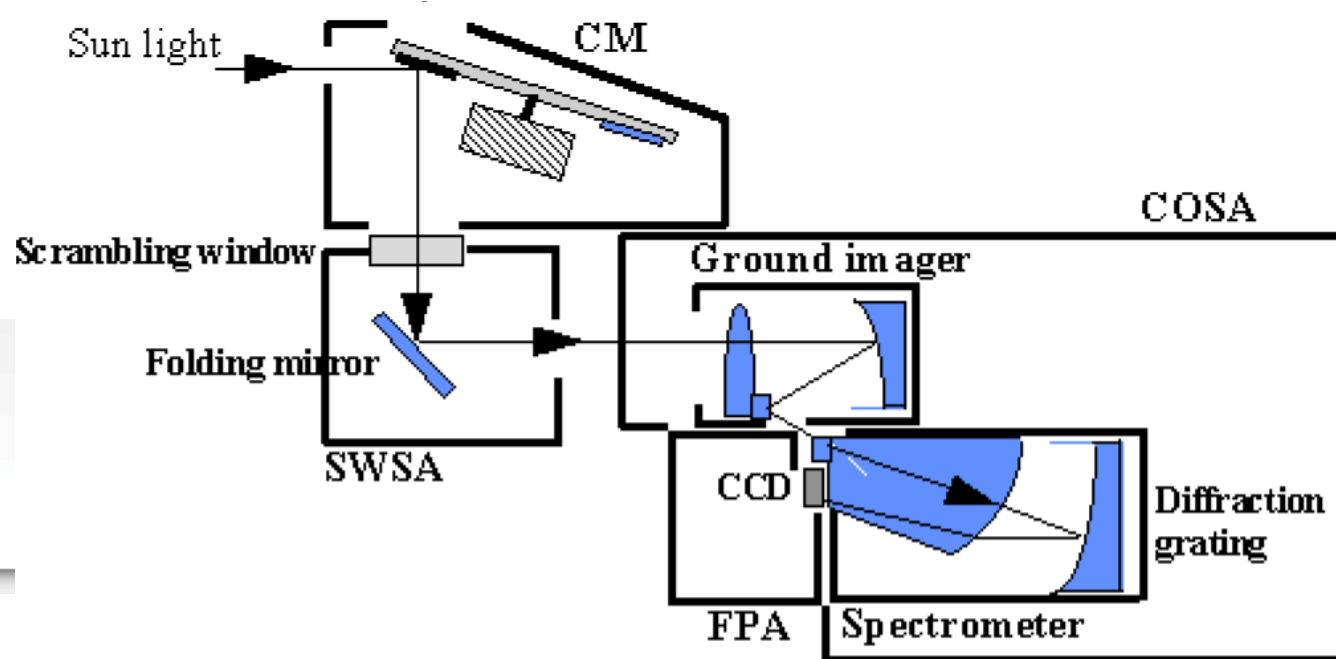
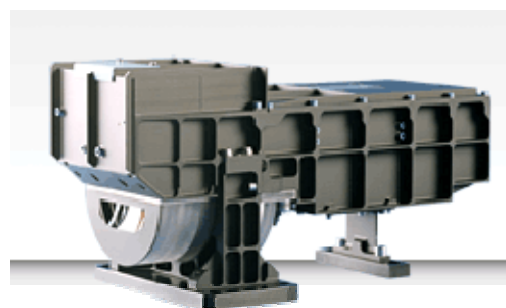
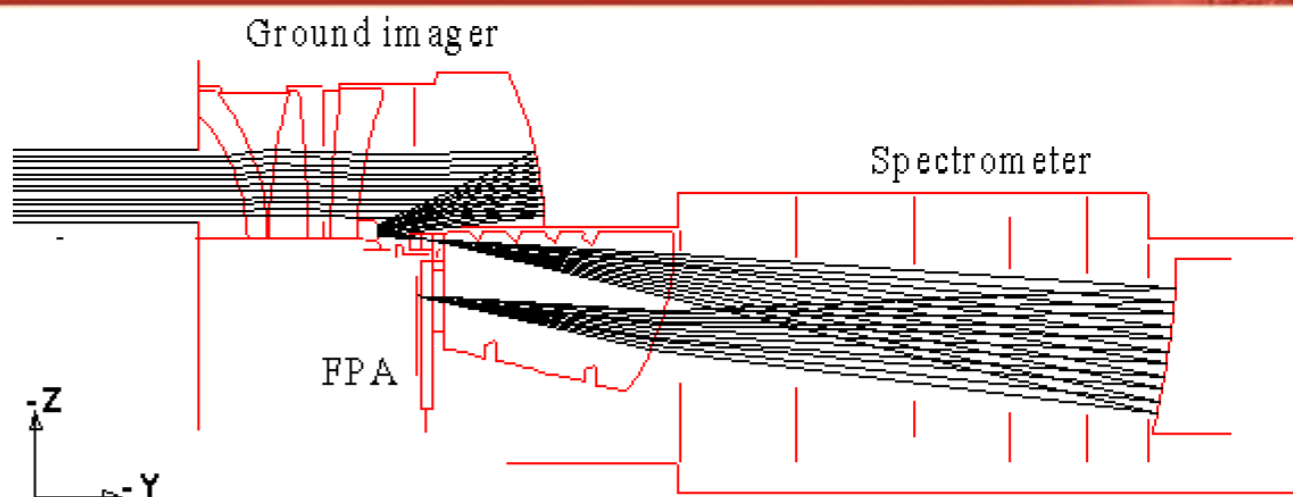


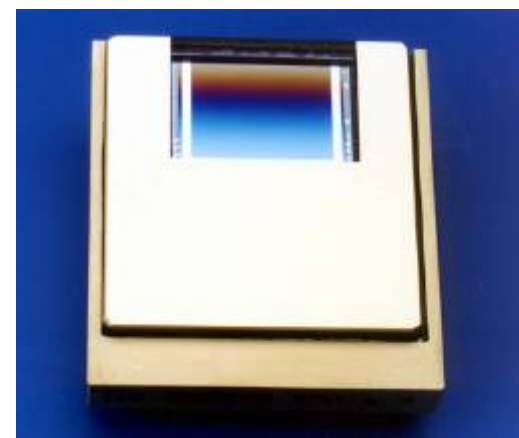
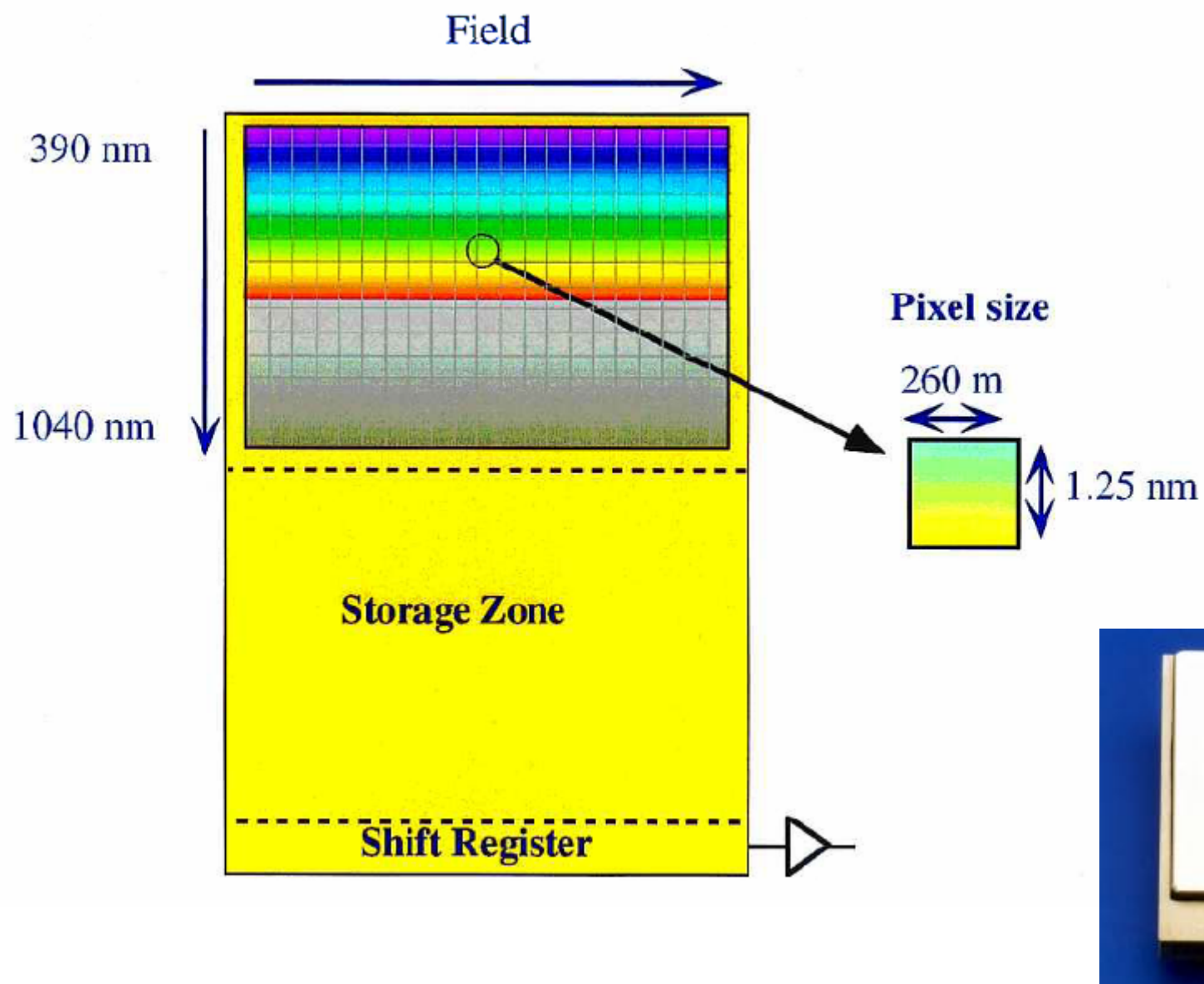
## ON-BOARD CALIBRATION

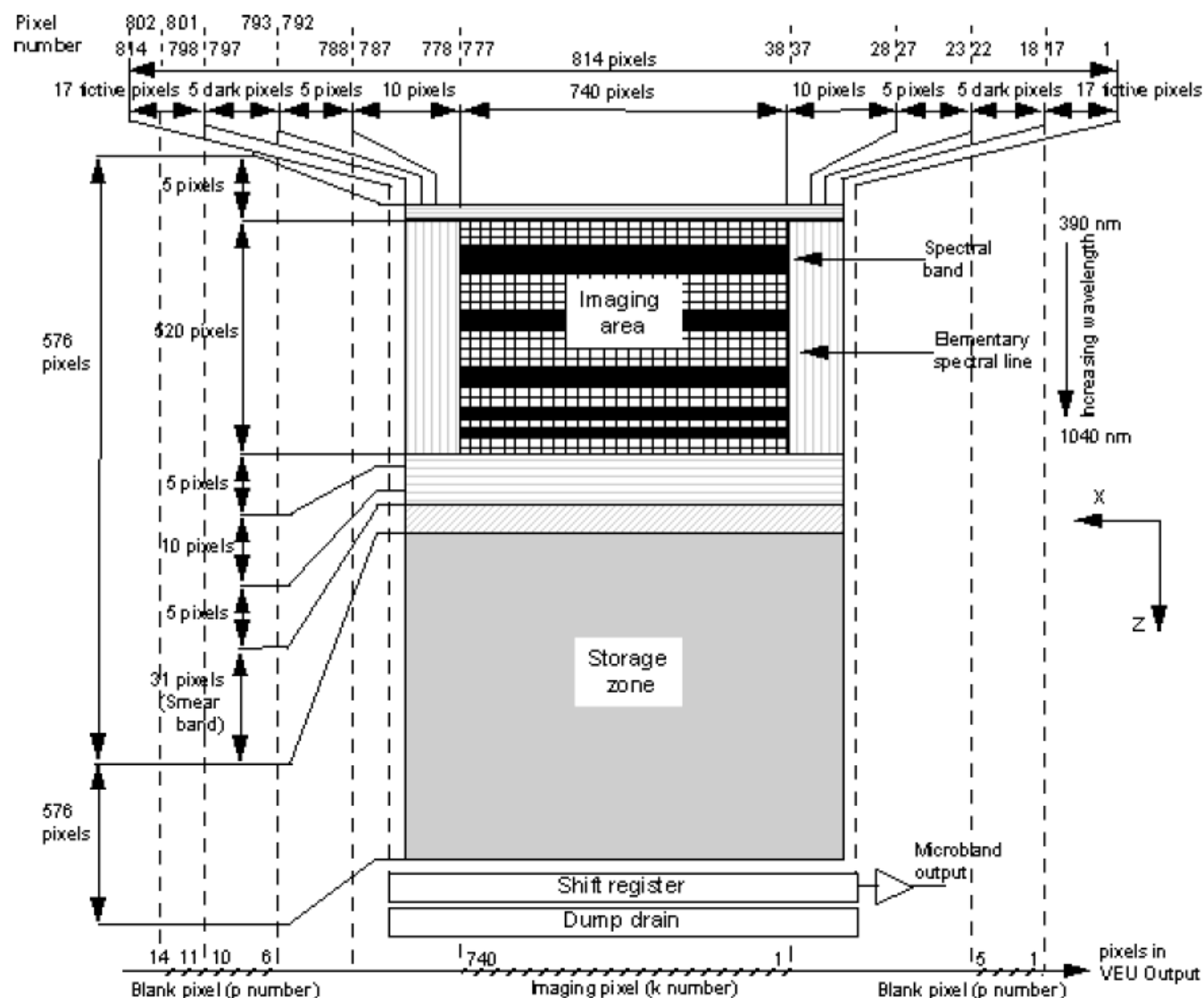










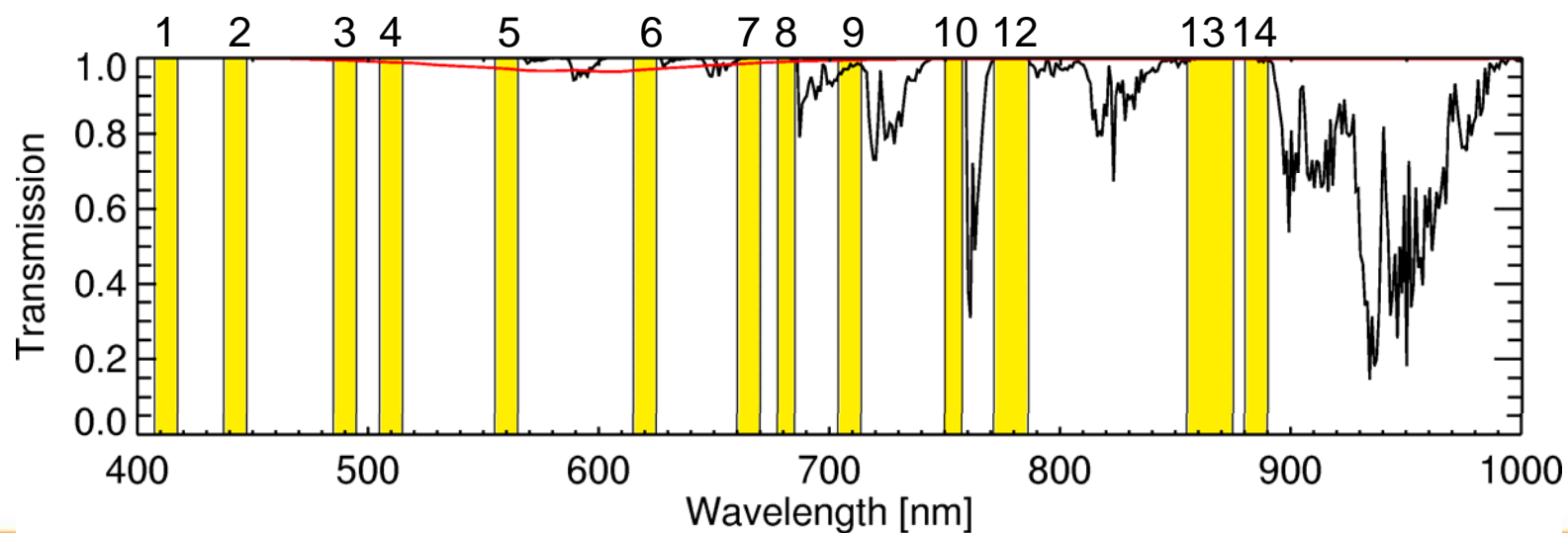
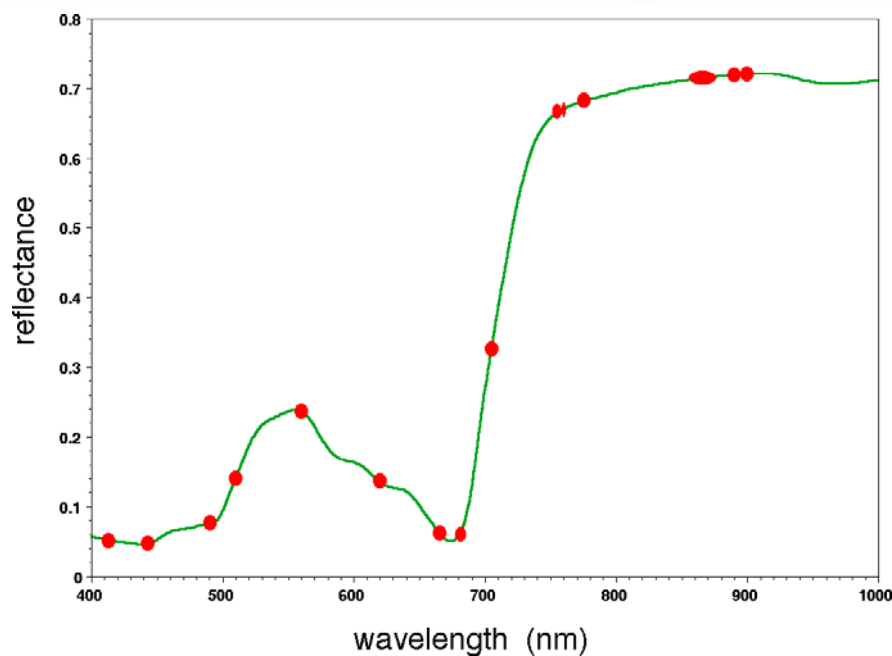


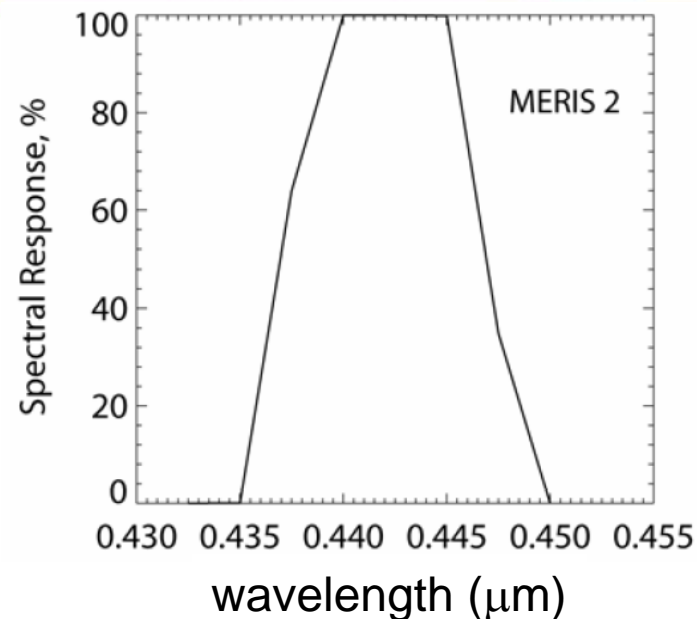
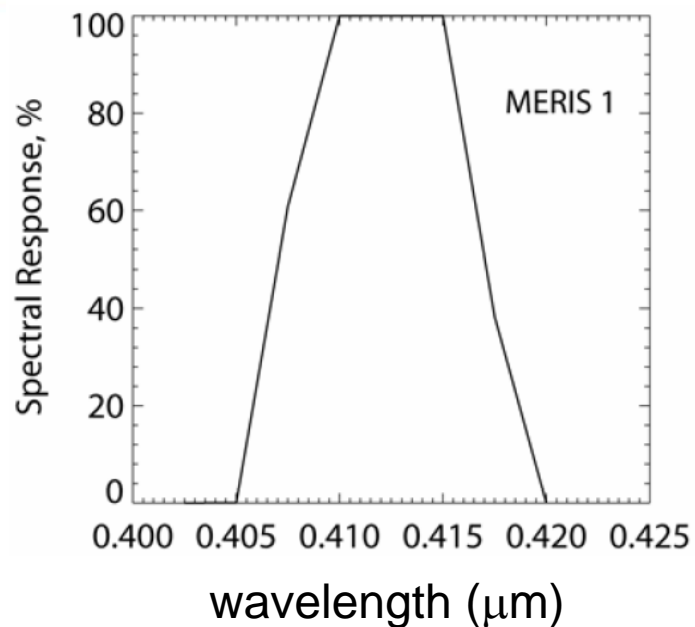
**High dynamic range due to optimised electronics allows to measure both very low signals (ocean) and very bright signals (clouds)**





No.	Band centre (nm)	Band width (nm)	Applications
1	412.5	10	Yellow substance and detrital pigments
2	442.5	10	Chlorophyll absorption maximum
3	490	10	Chlorophyll and other pigments
4	510	10	Suspended sediment, red tides
5	560	10	Chlorophyll absorption minimum
6	620	10	Suspended sediment
7	665	10	Chlorophyll absorption & fluorescence reference
8	681.25	7.5	Chlorophyll fluorescence peak
9	708.75	10	Fluorescence reference, atmosphere corrections
10	753.75	7.5	Vegetation, cloud, O <sub>2</sub> absorption band reference
11	760.625	3.75	O <sub>2</sub> R- branch absorption band
12	778.75	15	Atmosphere corrections
13	865	20	Atmosphere corrections
14	885	10	Vegetation, water vapour reference
15	900	10	Water vapour



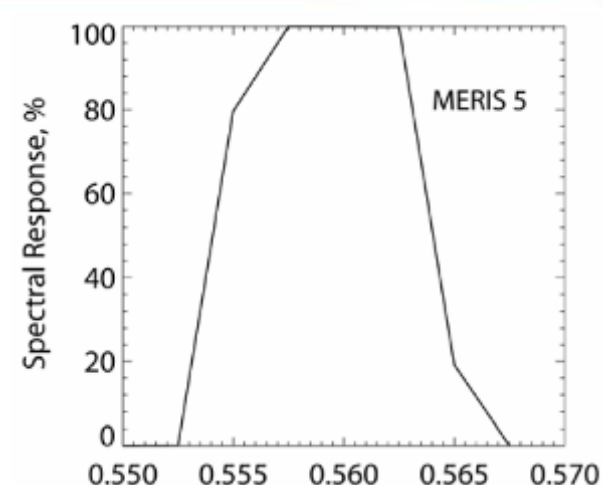
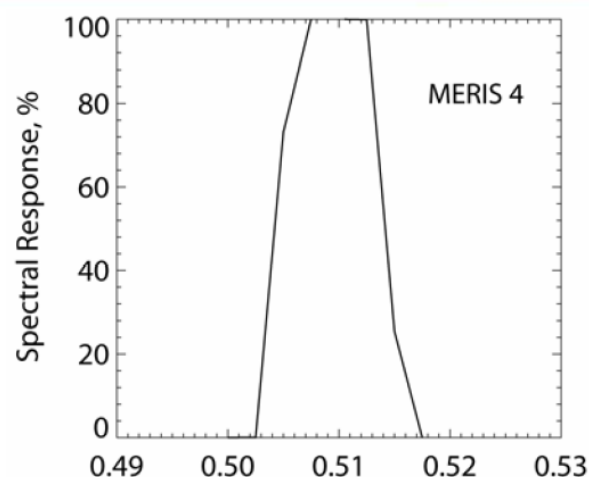
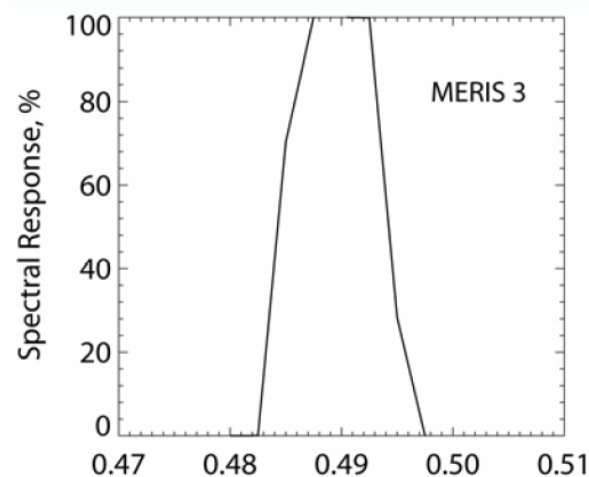


**Band 1:**  
**Yellow substance, turbidity**

**Band 2:**  
**Chlorophyll absorption maximum**

**Over land, for  
atmospheric corrections  
(blue bands for aerosols  
retrievals)**

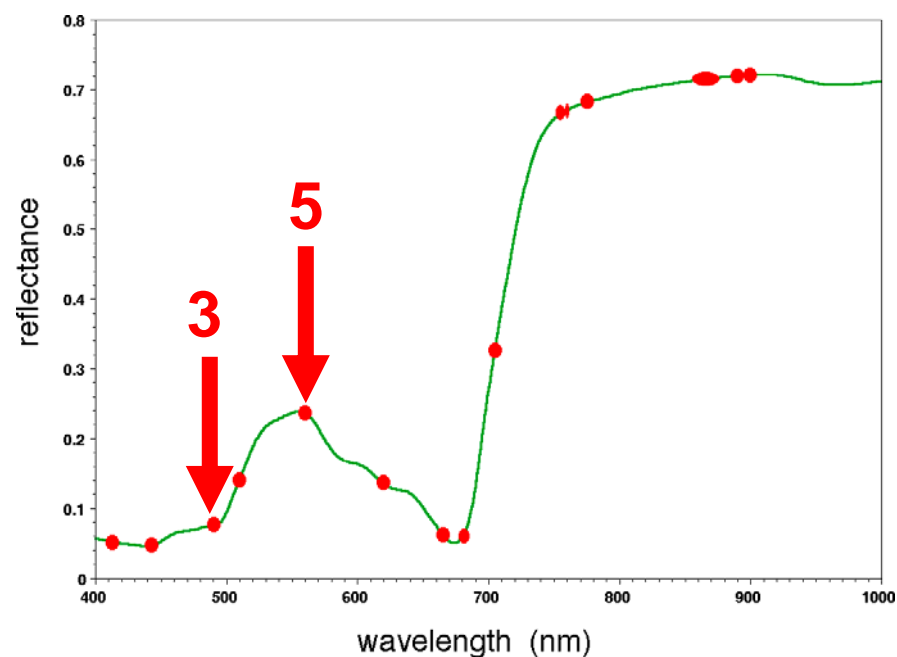




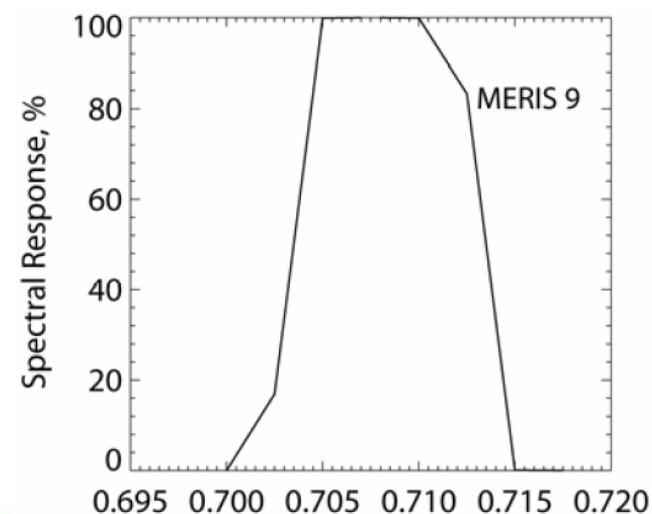
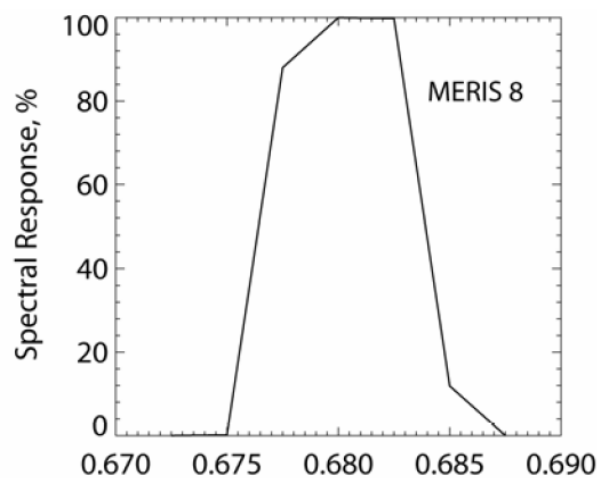
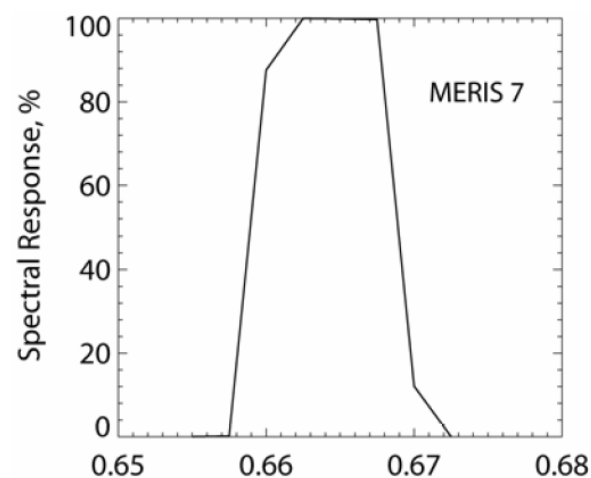
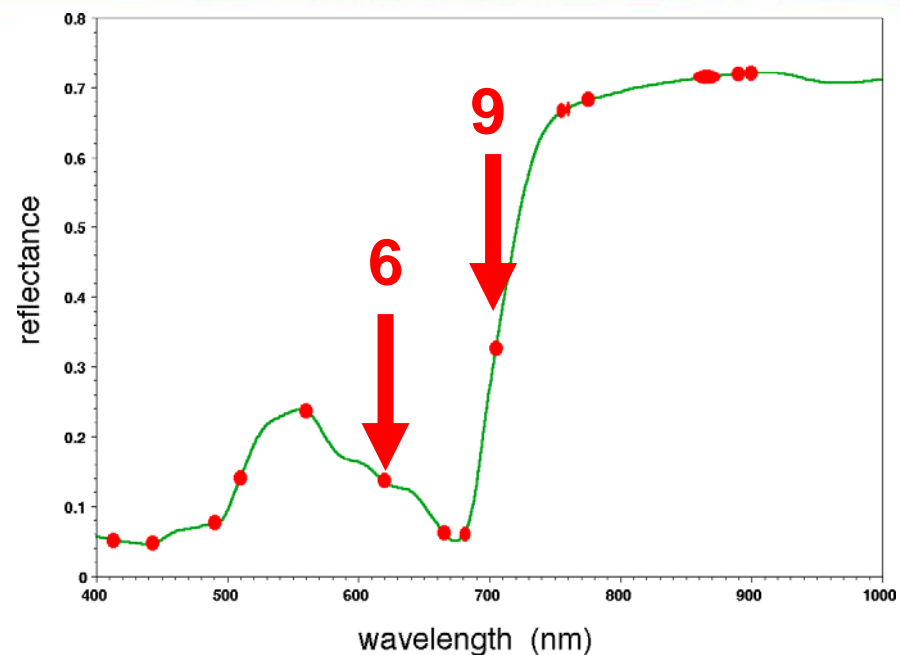
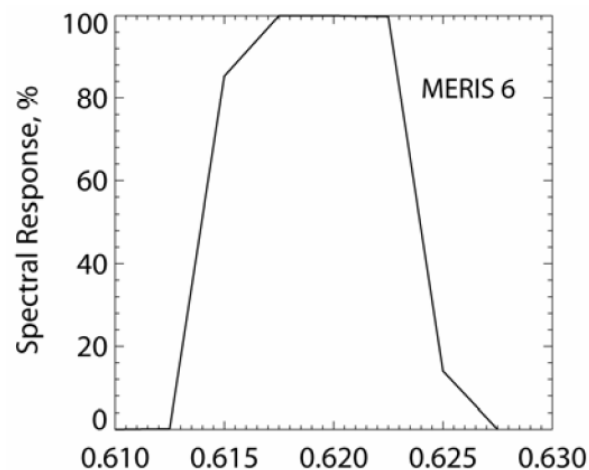
**Band 3:**  
Chlorophyll, other pigments

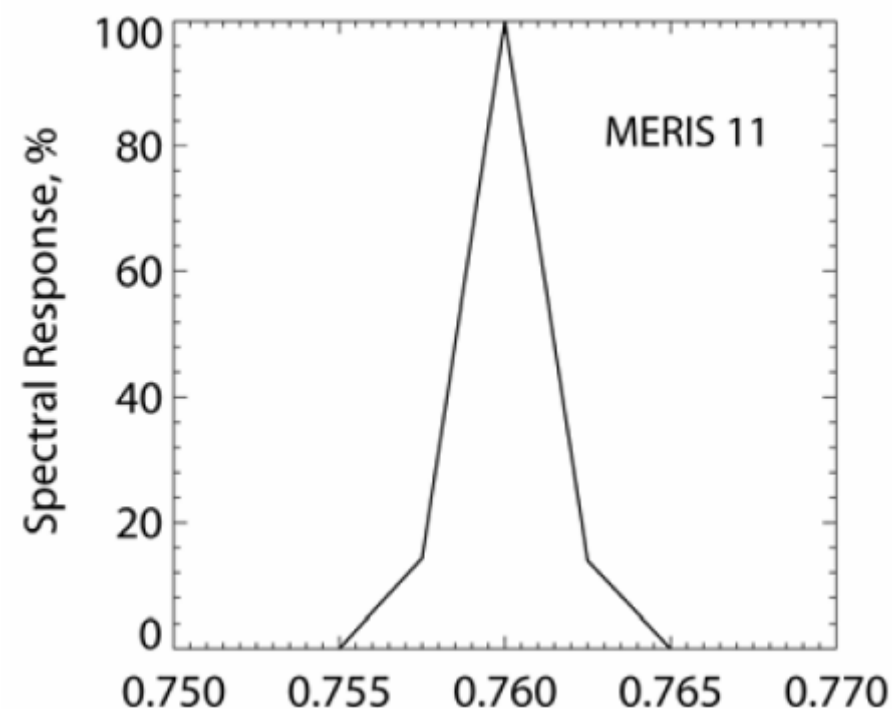
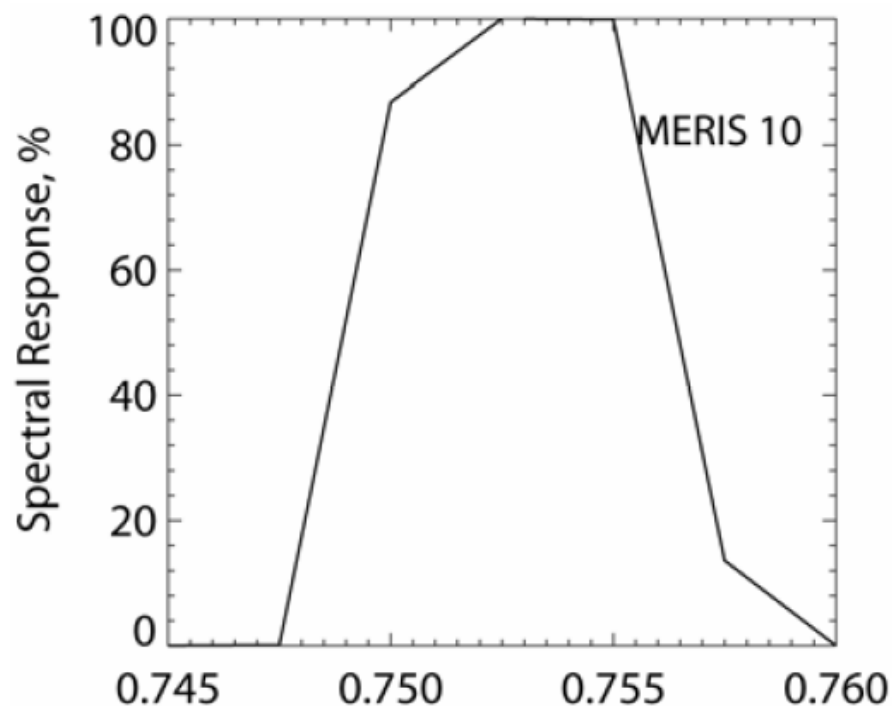
**Band 4:**  
Turbidity, suspended sediment, red tides

**Band 5:**  
Chlorophyll reference, suspended sediment



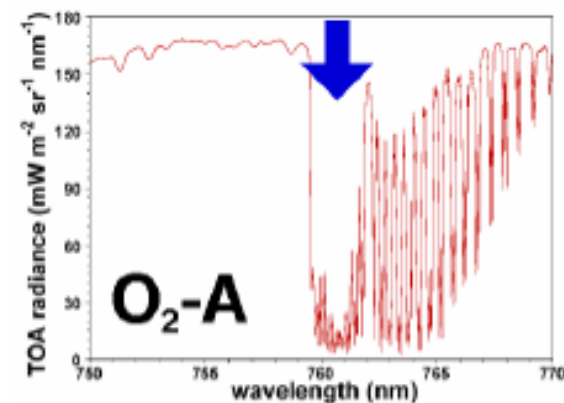
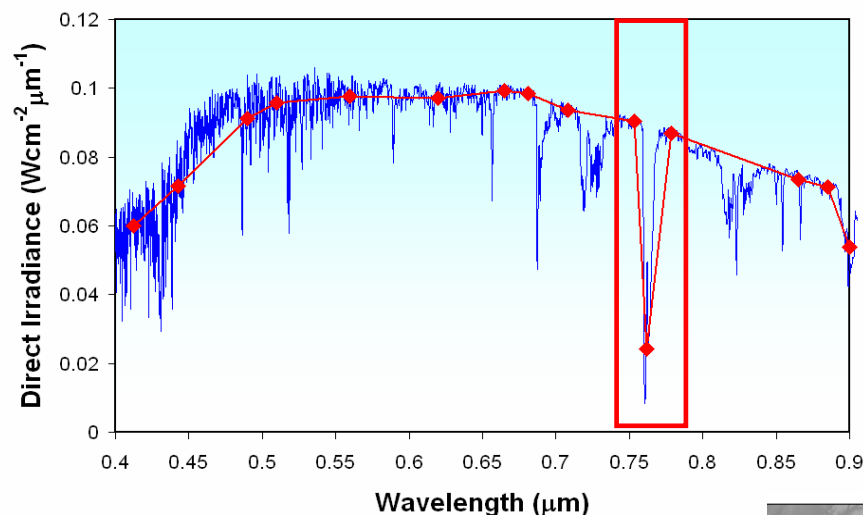
## Bands 6:9 Chlorophyll absorption, red-edge



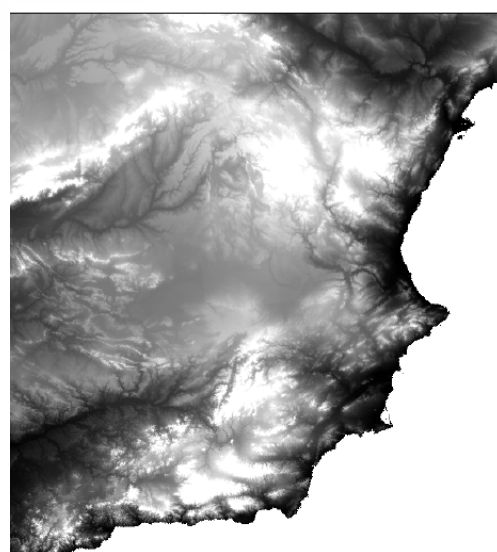


**Band 11 is dedicated to the determination of surface pressure, for accurate atmospheric corrections (Rayleigh scattering)**  
**Uses band 10 as reference baseline.**

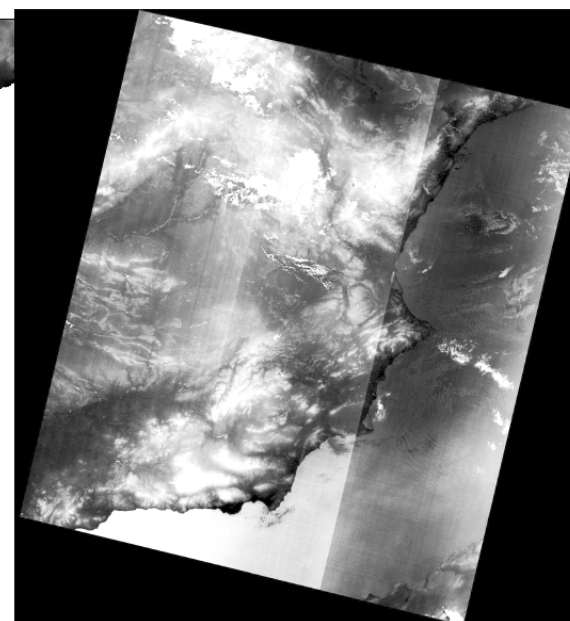




**Ratio B11/B10  
gives at the first order  
the surface pressure  
driven by topography**



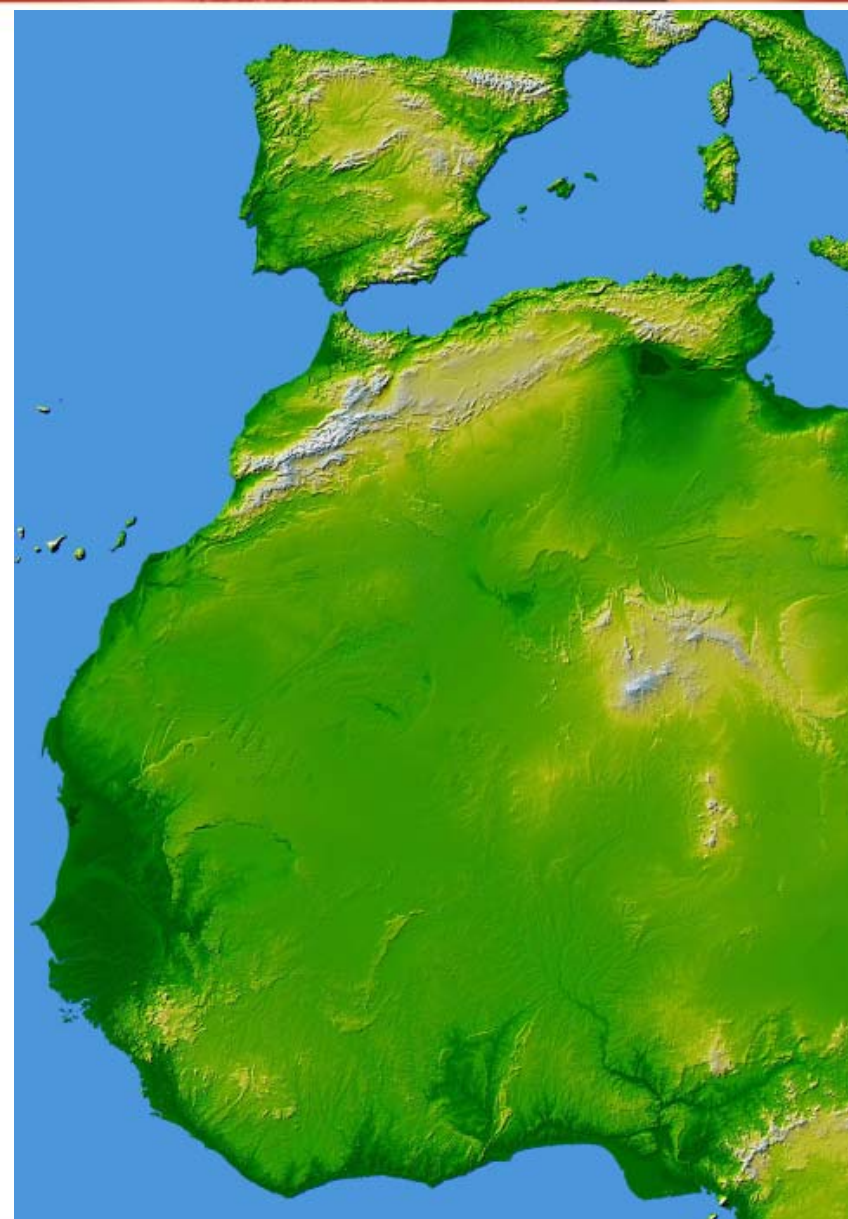
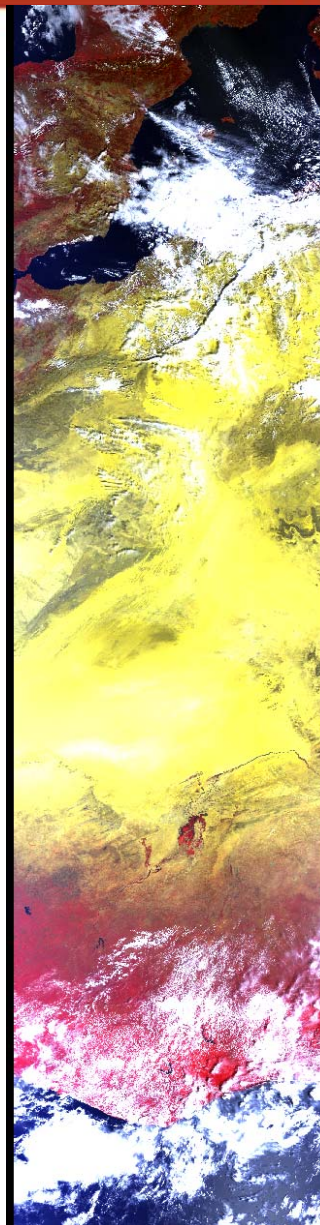
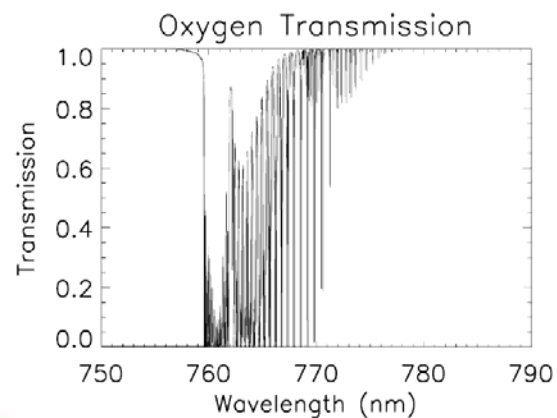
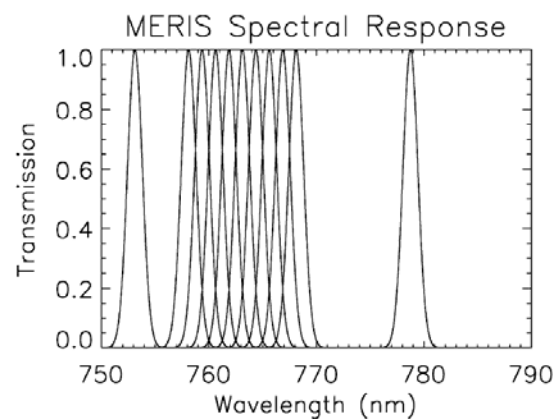
**DTM**



**Ratio MERIS B11/B10**

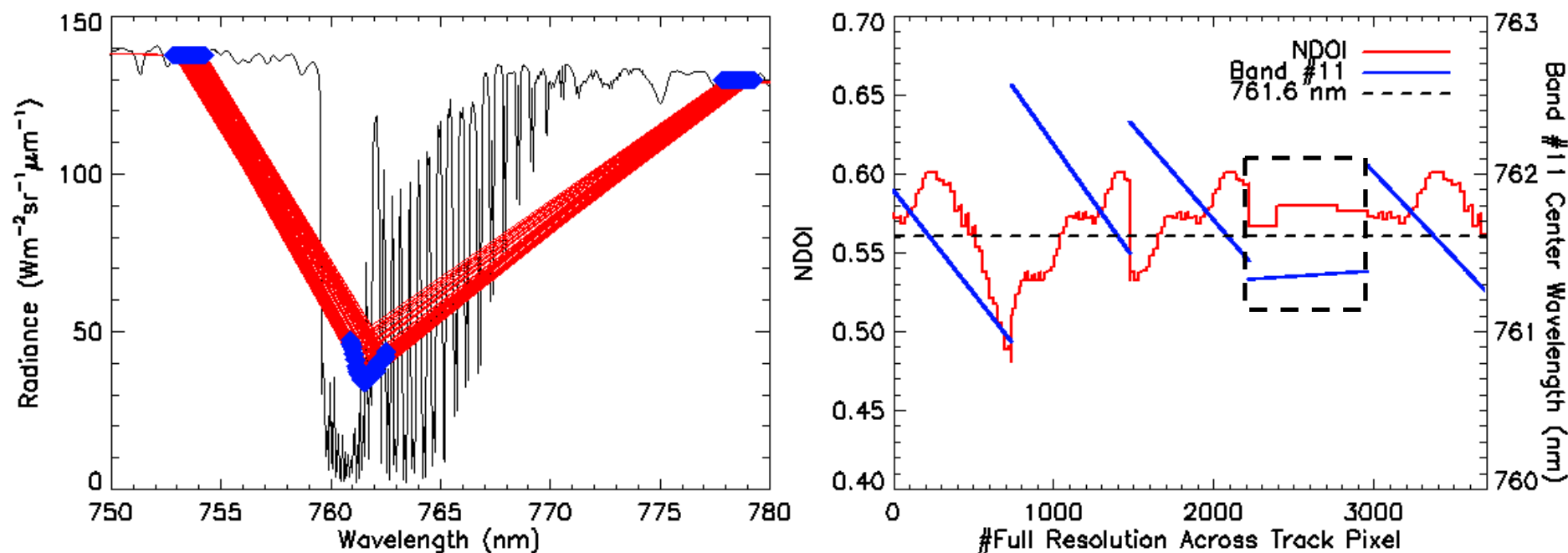
# MERIS Spectral Calibration Campaigns

15 narrow bands  
(covering the O<sub>2</sub>-A  
absorption feature)

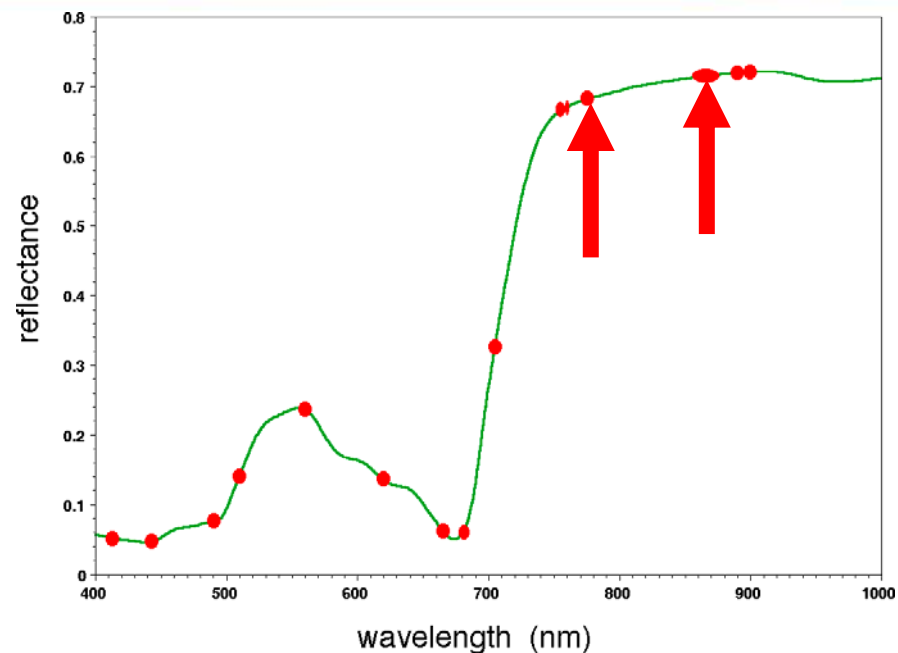
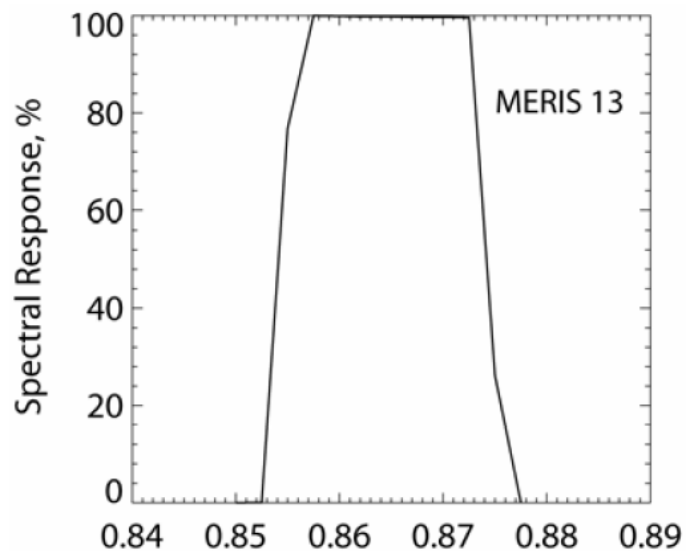
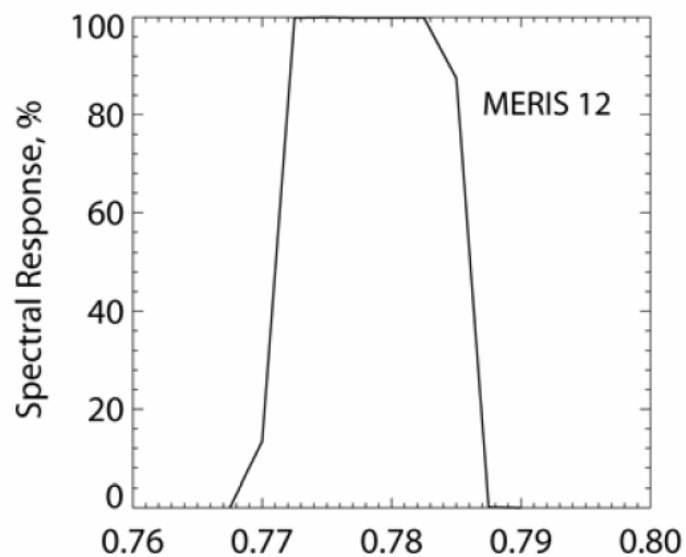




- 5 cameras varying channel center wavelengths
- Different impact on bands inside and outside O<sub>2</sub>-A



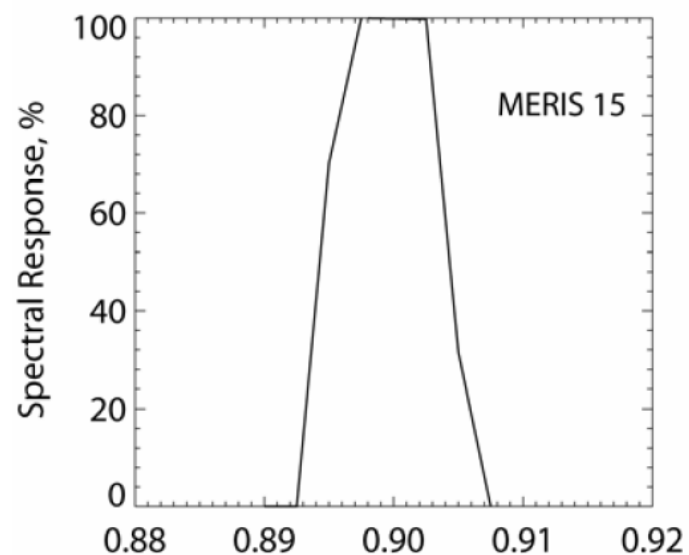
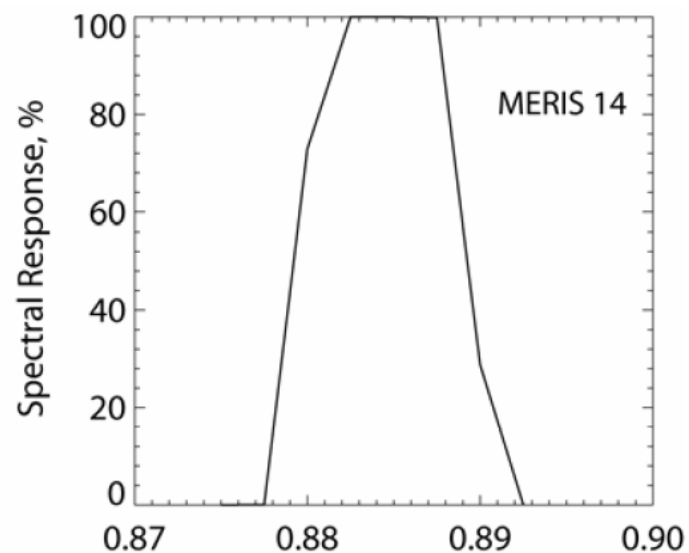




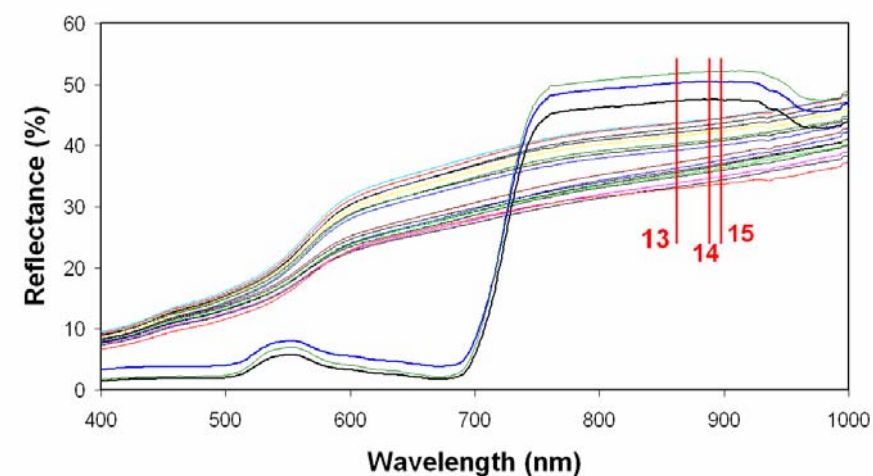
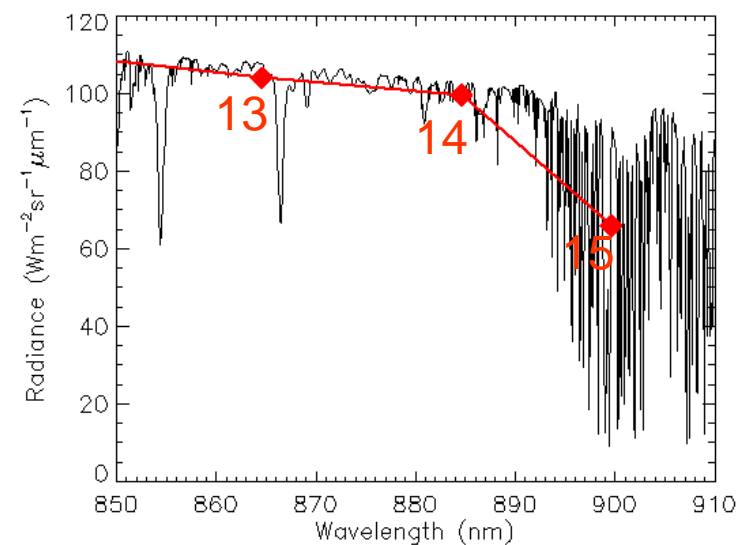
**Band 12:**  
**Aerosols, vegetation**

**Band 13:**  
**Aerosols corrections over ocean**



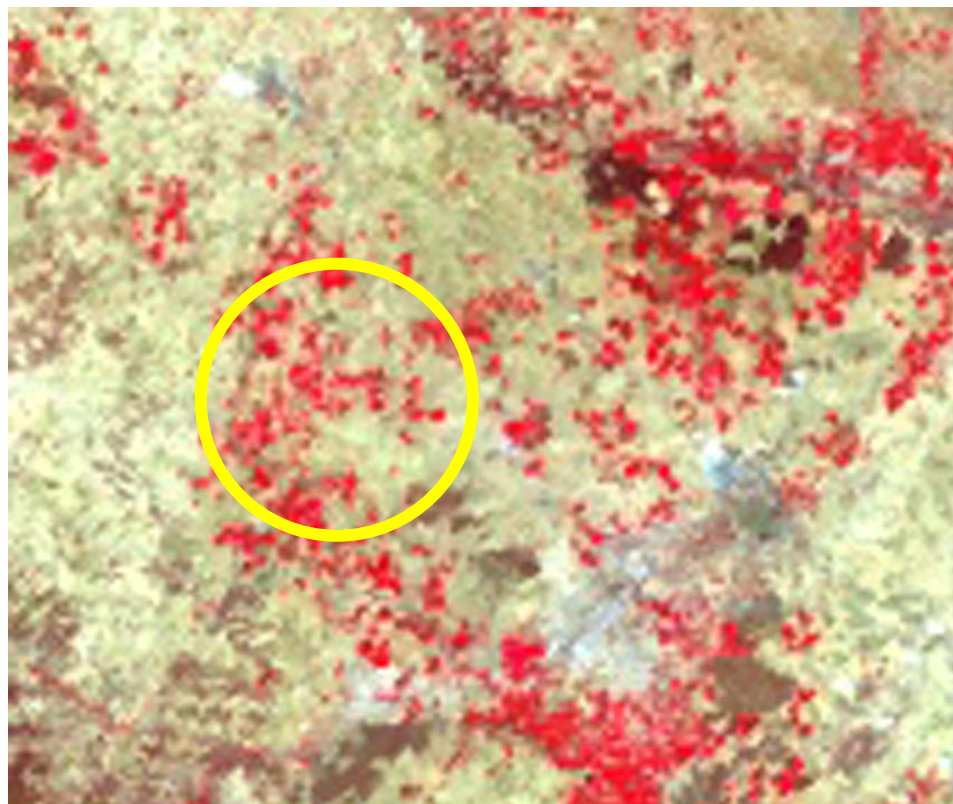


## atmospheric water vapour retrieval





## MERIS - 14 July 2003



## Landsat - 15 July 2003

