

M.G. Blasi, G. Liuzzi, **G. Masiello**, C. Serio, S. Venafrà

*Applied Spectroscopy group, School of Engineering,
University of Basilicata, Potenza*

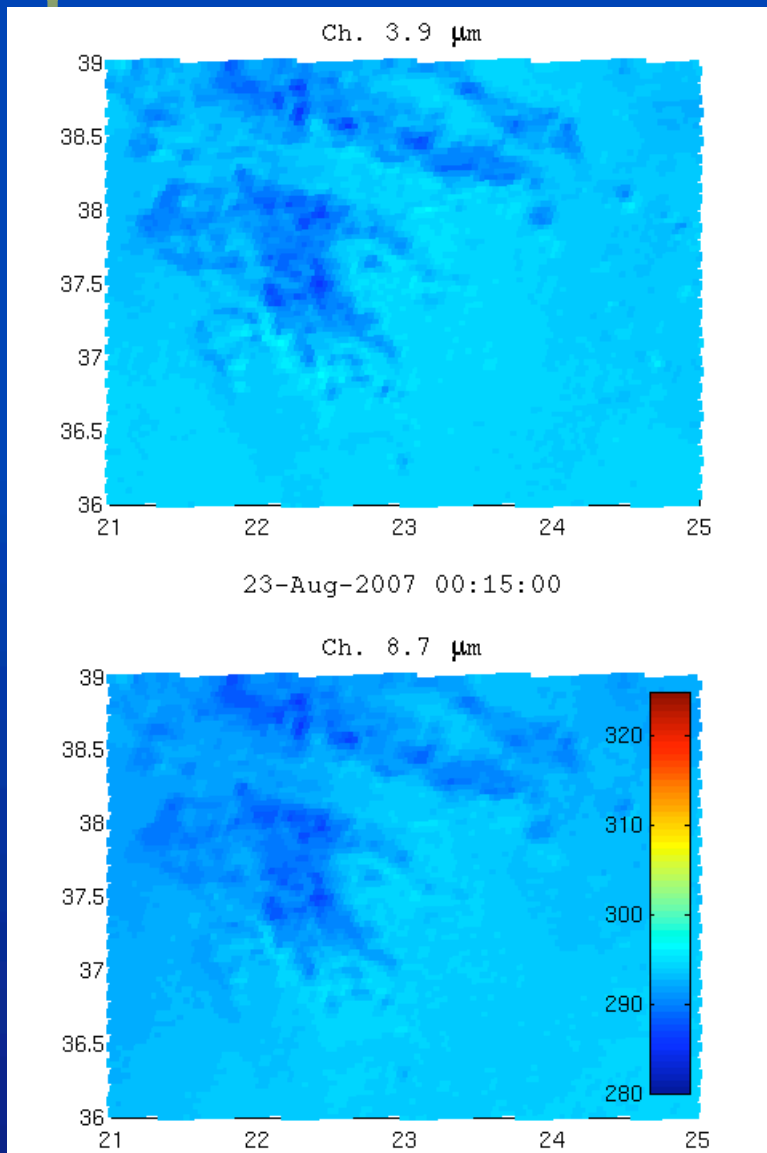
Why we need Meteosat Third Generation

M.G. Blasi, G. Liuzzi, **G. Masiello**, C. Serio, S. Venafrà

*Applied Spectroscopy group, School of Engineering,
University of Basilicata, Potenza*

Case Studies: Greece

- Destructive and lethal fires in Peloponnese and southern Euboea regions from 23 August to 27 August, until they were put out in early September.
- In total 84 people lost their lives because of the fires, including several fire fighters.



**From 23-August-2007 00:00:00
To 30 August-2007 23:45:00**

High Rate SEVIRI Level 1.5 Image Data

Two days before

- Severe collocation problems observed the 21 of August.
- The instrument oscillates in N-S direction with an amplitude of 0.2-0.3 degrees between 9 and 16 GMT.
- MSG is a spinned satellite

**From 21-August-2007 00:00:00
To 22 August-2007 23:45:00**

High Rate SEVIRI Level 1.5 Image Data

Meteosat Third Generation (MTG)

Third Generation — Bigger and Better

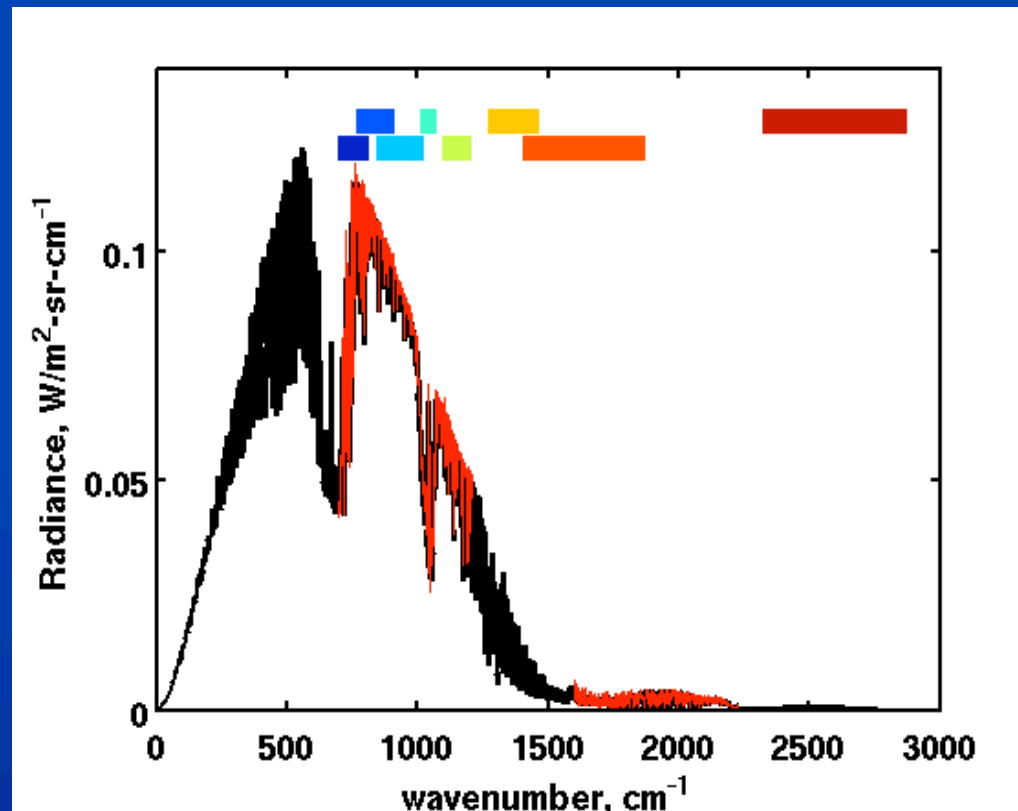
Twin Satellite Concept, based on 3-axis platforms.

- Four Imaging Satellites (MTG-I) (20 years of operational services expected) with the following Payload
 - The Flexible Combined Imager (FCI)
 - The Lightning Imager (LI)
 - The Data Collection System (DCS) and Search and Rescue (GEOSAR)
- Two Sounding Satellites (MTG-S) (15.5 years of operational services expected) with the following payload Payload complement of the MTG-S satellites:
 - **The Infrared Sounder (IRS)**
 - The Ultra-violet, Visible and Near-infrared Sounder (UVN)



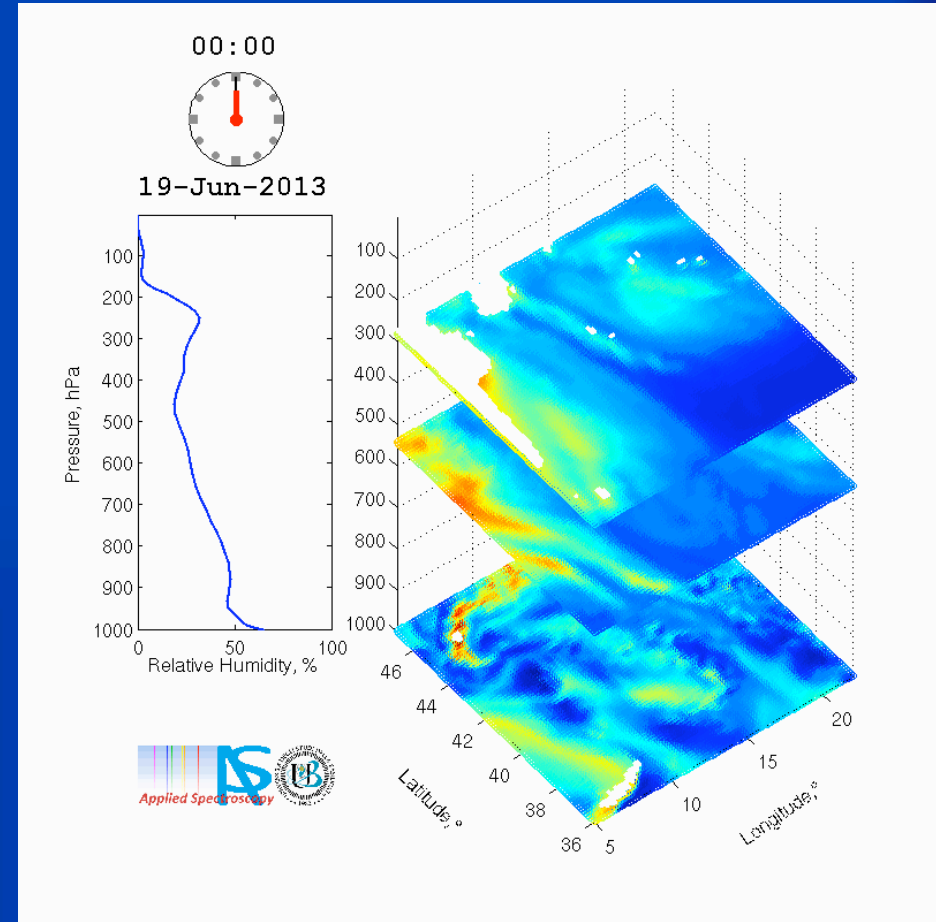
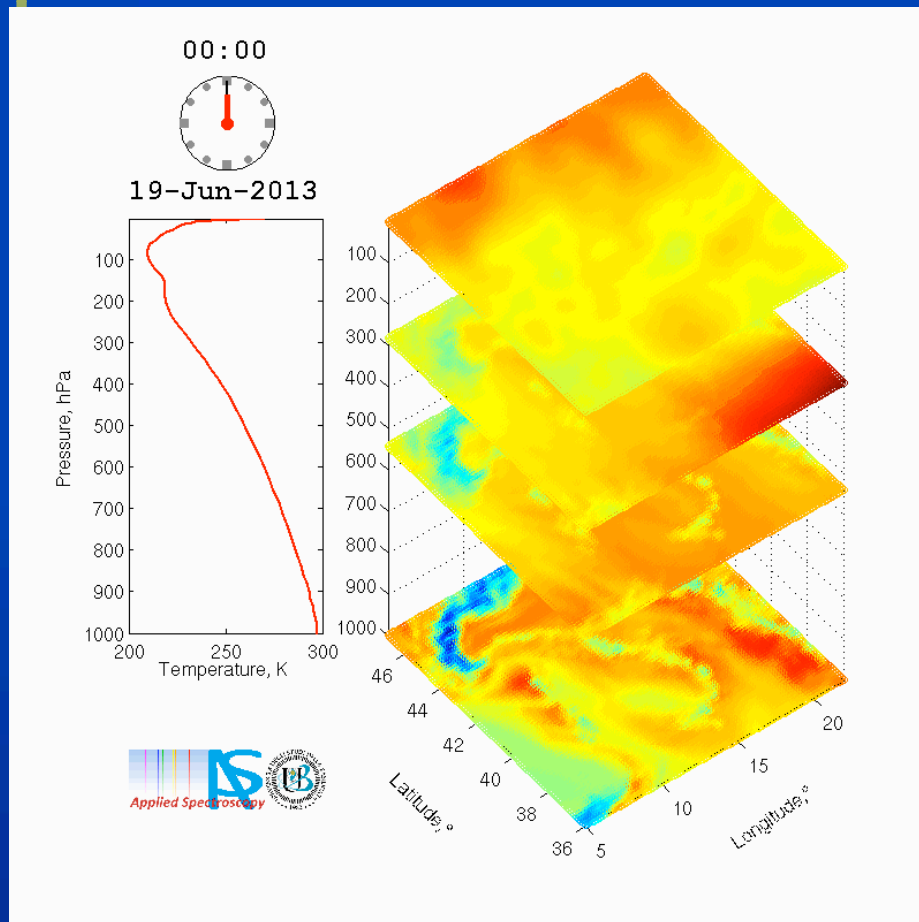
- The sounder will be one of the key innovations in the new programme, for the first time allowing Meteosat satellites to image weather systems and analyse the atmosphere layer-by-layer, therefore, performing far more detailed chemical composition studies.

The Infrared Sounder (MTG-IRS)



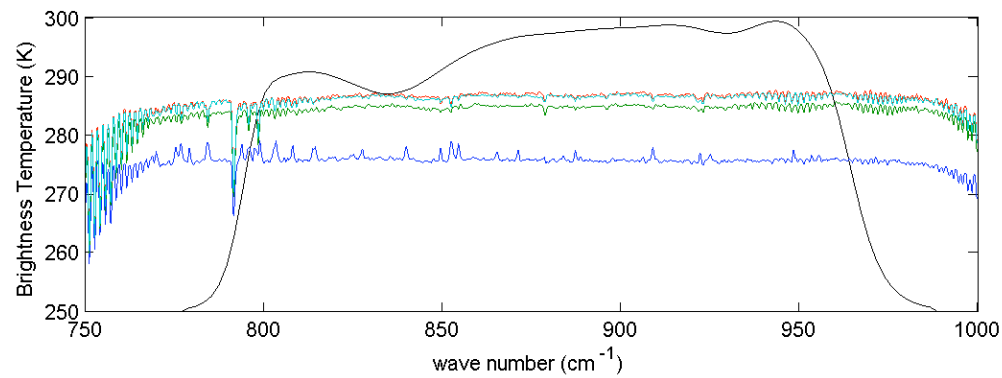
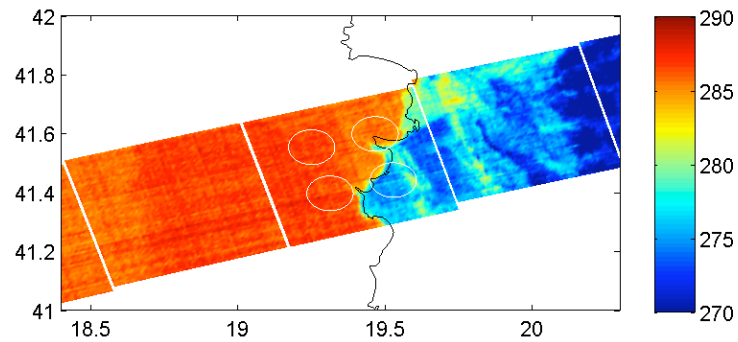
- The IRS is based on an imaging Fourier-interferometer with a hyperspectral resolution of 0.625 cm⁻¹ wave-number, taking measurements in two bands, the Long-Wave InfraRed (LWIR) and the Mid-Wave InfraRed (MWIR), with a spatial resolution of 4 km. The IRS will deliver over the Full Disk in the LWIR (700–1210 cm⁻¹ or 14.3–8.3 μm) 800 spectral channels and in the MWIR (1600–2175 cm⁻¹ or 6.25–4.6 μm) 920 channels with a basic repeat cycle of 60 min.

Atmospheric Structure in 4D



- The Infrared Sounder (IRS) on MTG-S will be able to provide unprecedented information on horizontally, vertically, and temporally (4-dimensional) resolved water vapour and temperature structures of the atmosphere.
- Retrieving highly resolved vertical structures of humidity (~ 2 km resolution with 10% accuracy) and temperature (~ 1 km with 0.5° – 1.5° accuracy) by remote sensing techniques does require measurements within the water vapour and CO₂ absorption bands with extremely high spectral resolution and accuracy.

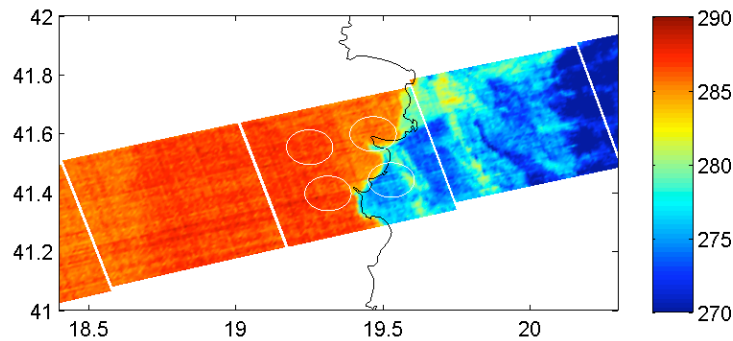
Water vapor Lines: Absorption and Emission



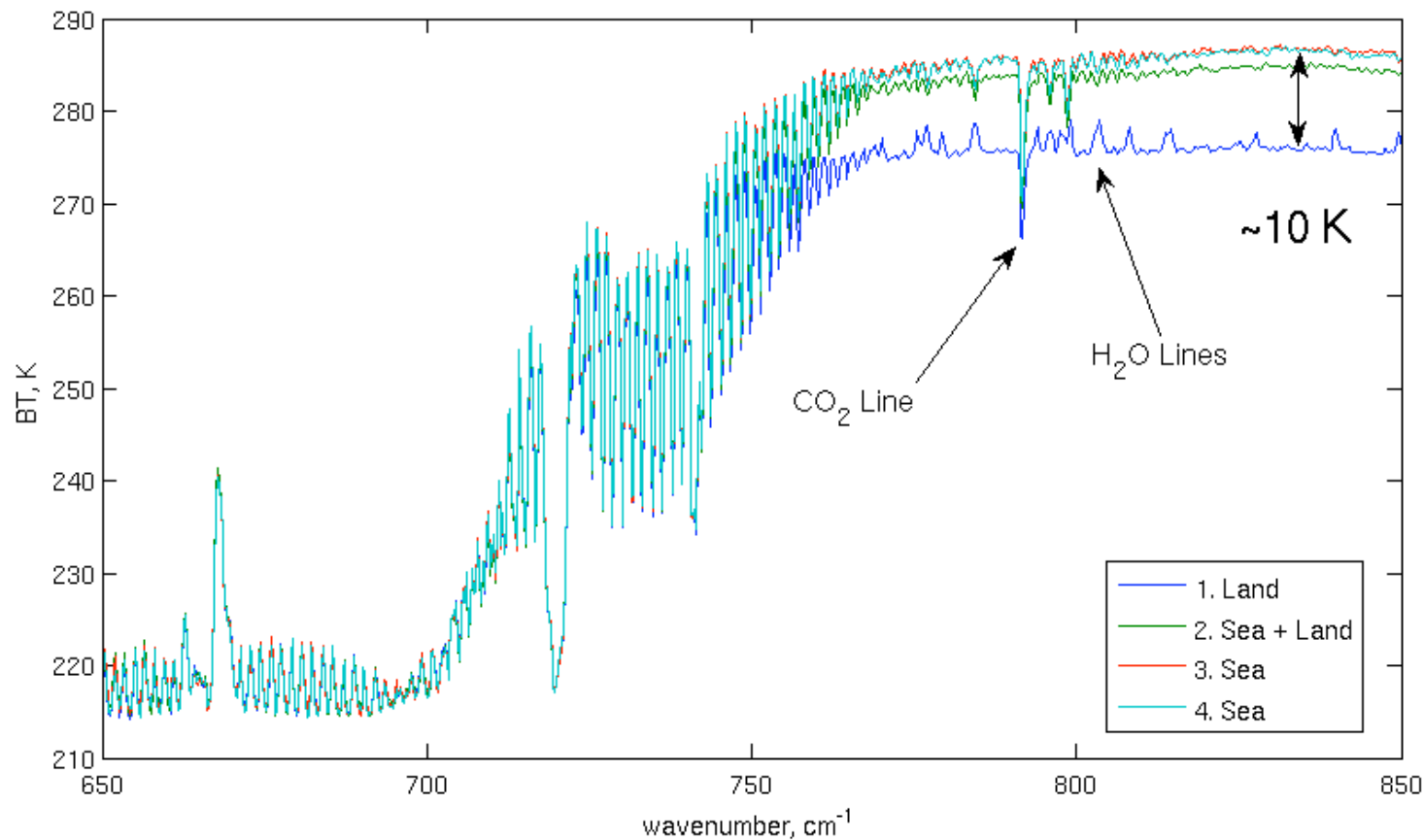
IASI Spectra

IIS ISRF

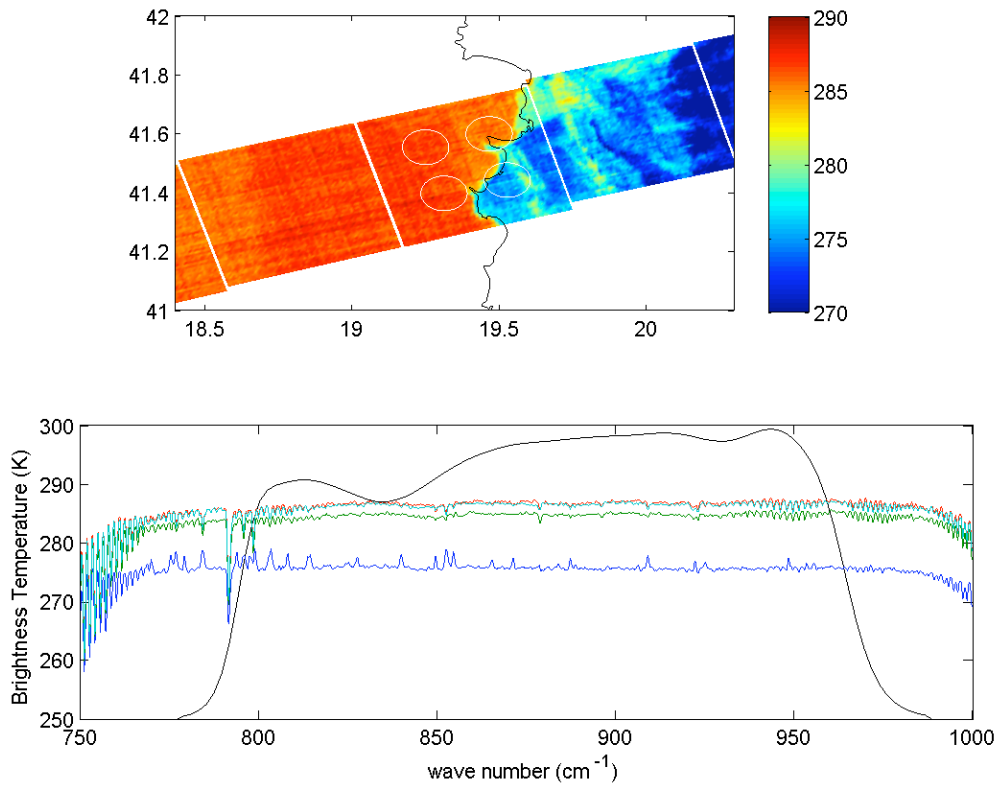
Water vapor Lines: Absorption and Emission



When the surface temperature is smaller than the temperature of the lower part of atmosphere, water vapor lines in the window are in emission



Water vapor Lines: Absorption and Emission



IASI Spectra

IIS ISRF