

# NWC SAF GEO-S Sounder Package

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AEMET

EUMeTrain, May 2025



# Summary

- Nowcasting SAF GEO-S Sounder Package
- NWC SAF GEO-S: Products and Services
- MTG-IRS: Working Principles

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# NWC SAF GEO-S Sounder Package

- This Nowcasting SAF GEO-S is a new software package constituting products and services obtained with data from MTG-IRS, EUMETSAT's geostationary hyperspectral infrared sounder
- Nowcasting SAF has traditionally delivered software packages which can be run locally to get best (minimum) possible timeliness
- In the next phase (CDOP5) we are planning to also generate the products in the European Weather Cloud (EWC)
- But... right now we are generating prototype products in the EWC and disseminating them via a WMS server (see later slides on NWC SAF Viewer via ADAGUC)
- The future GEO-S products and services will follow the same pattern → They will be available as prototype products as soon as possible in the NWC SAF Viewer (ADAGUC)
- The products and services will be released officially at the beginning of CDOP 5 phase of the project. Expected date: end 2027

# Summary

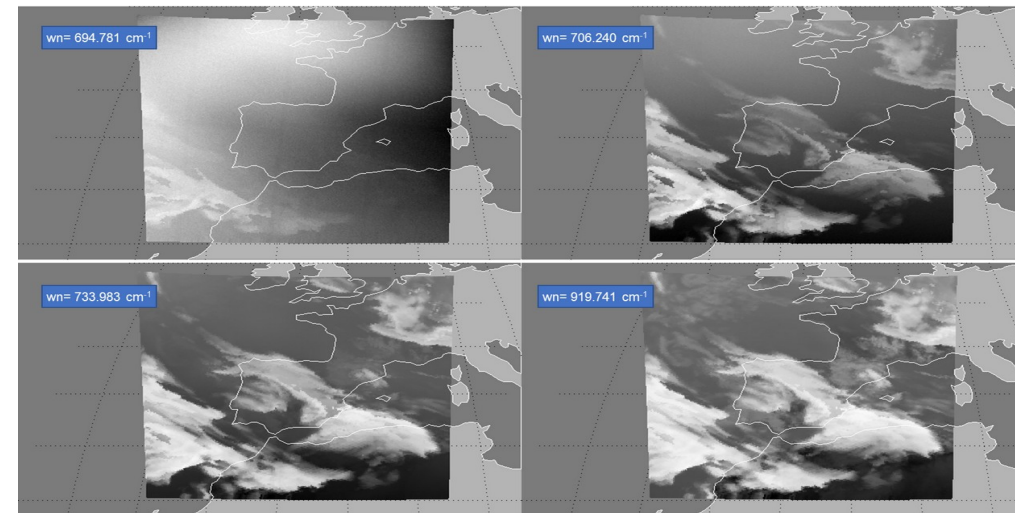
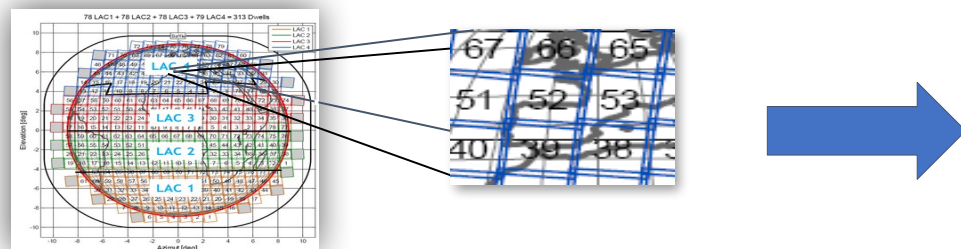
- Nowcasting SAF GEO-S Sounder Package
- NWC SAF GEO-S: Products and Services
- MTG-IRS: Working Principles

# NWC SAF GEO-S Services and Products. Intro

- **Quick IRS Service (qIRS):** Pseudo linear combination of MTG-IRS Principal Components
- **Sounder Satellite Humidity And Instability (sSHAI):** Retrievals of vertical profiles of temperature and humidity.
- **Sounder Satellite Humidity And Instability based on EUMETSAT Secretariat retrievals Service (sSHAI\_ES):** Post processing of EUMETSAT Secretariat profiles of temperature and humidity.
- **Remapping tool to FCI grid:** Tool to re-project MTG-IRS products onto the MTG FCI imagers.

# NWC SAF GEO-S Services and Products: qIRS

- **Quick IRS Service (qIRS):** Combine (pseudo) linearly MTG-IRS Principal Components (PC), which are distributed via EumetCast Satellite, into brightness temperatures, RGBs, physical parameters or any other (pseudo) linear combination of PCs
- EUMETSAT will disseminate by EUMETCast the IRS L1 products on netCDF file by dwells but user likely will use on regions.
- MTG-IRS L1 data will be disseminated compressed as 300 Principal Components (EOFs) instead of 1960 channels (lossy compression).



- Segmented in one file in NetCDF format for each “dwell” **without** a fixed grid.
- **Spatial resolution of 4 km**
- Needed later a remapping and concatenation of several dwells to cover one NWCSAF user’s region of interest.
- Output be written in netCDF CF compliant files.



# NWC SAF GEO-S Services and Products: sSHAI

- **Sounder Satellite Humidity And Instability (sSHAI):** Fully Nowcasting oriented retrievals of vertical profiles of temperature and humidity over partly cloudy scenes (up to 80% cloud fraction) and their associated stability indices. Accuracy of 1 K in 1 km vertical layers for temperature and 15% in 2 km vertical layers for humidity. Expected timeliness of 18 minutes. More details later.

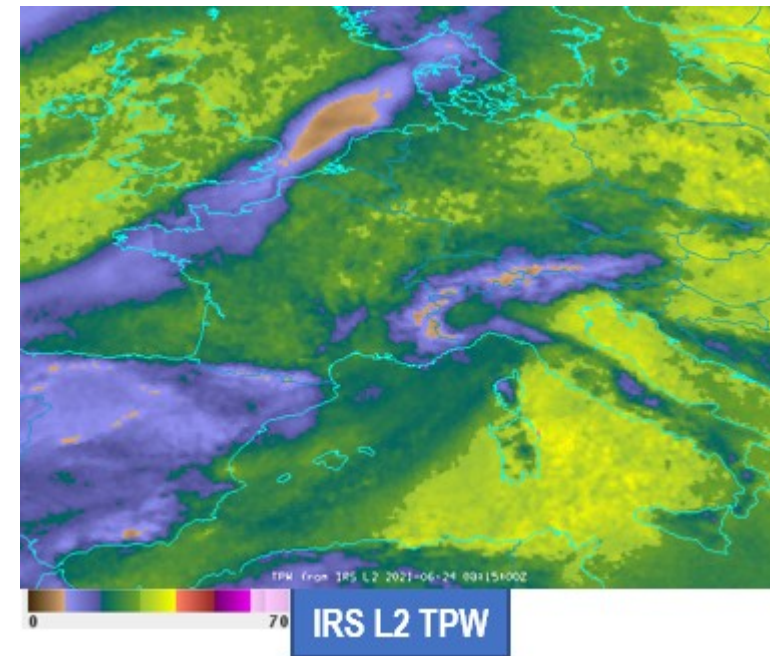
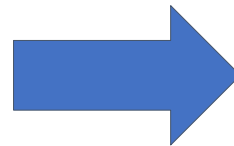
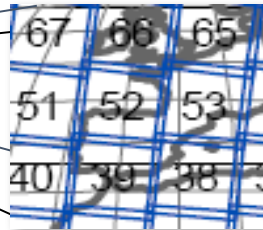
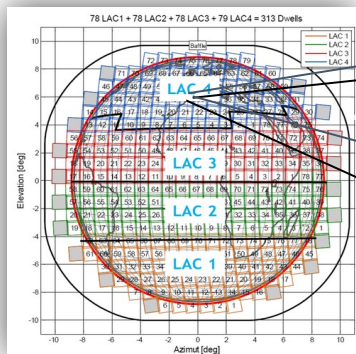


# NWC SAF GEO-S Services and Products: sSHAI\_ES

- **Sounder Satellite Humidity And Instability based on EUMETSAT Secretariat retrievals Service (sSHAI\_ES):** EUMETSAT Secretariat will disseminate from day 1 general purpose vertical profiles of temperature and humidity to users. Timeliness will be 30 minutes. The NWC SAF will provide a package to post-process this product: complement with surface station data, stability indices, etc.

# NWC SAF GEO-S Services and Products: Remapping Tool

- **Remapping tool to FCI grid.** This tool will concatenate and reproject any of the above MTG-S IRS NWC SAF products (qIRS, sSHAI and sSHAI\_ES) in the NWCSAF user's region of interest onto the FCI grid. This tool will be very useful to compare all MTG products (from FCI, IRS and LI) on the common FCI grid.
- EUMETSAT will disseminate by EUMETCast the IRS L2 products on netCDF file by dwells but user likely will use on regions
- EUMETSAT Secretariat IRS L2 profiles will be disseminated on hybrid levels (101 or 137 levels) or in 101 RTTOV pressure levels.
- Better for nowcasting users if it is made an interpolation to one configurable set of pressure levels.



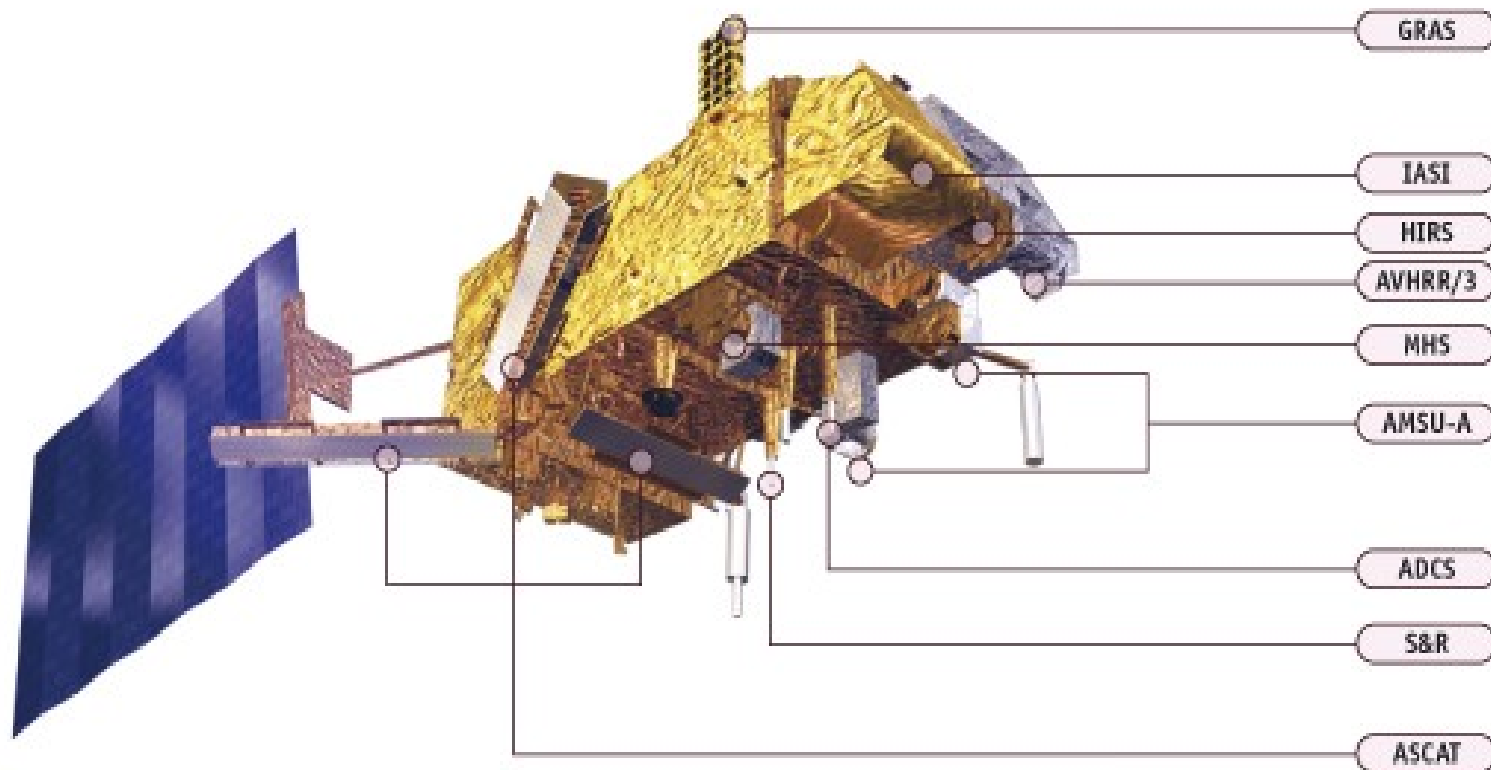
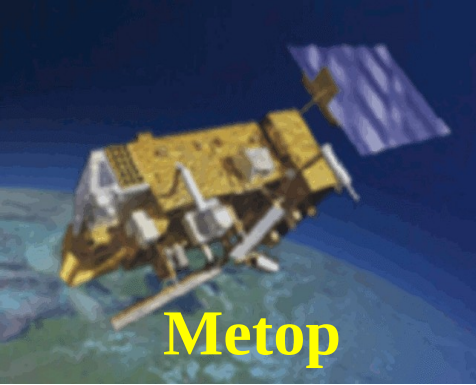
- Segmented in one file in NetCDF format for each “dwell” **without** a fixed grid.
- **Spatial resolution of 4 km**
- Needed later a remapping and concatenation of several dwells to cover one NWCSAF user's region of interest.

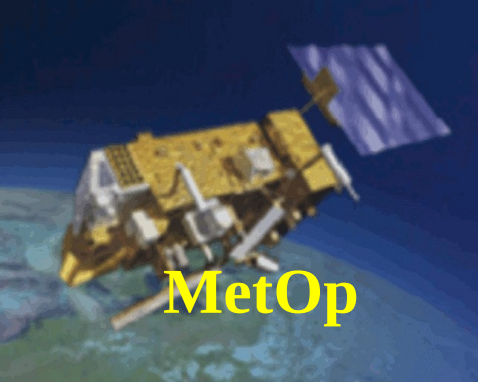
- Output be written in netCDF CF compliant files

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# Metop IASI as a proxy for MTG-IRS





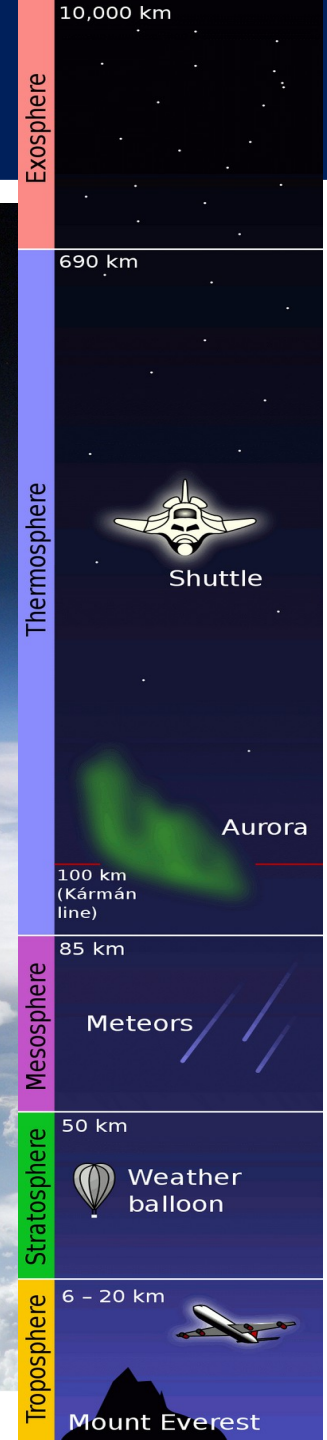
# MetOp IASI: propiedades

Número de Canales	Longitudes de onda ( $\mu\text{m}$ )	Resolución espacial	Resolución espectral	Zona del espectro	Tipus
8461	3.62-15.5	12 km	0.5 $\text{cm}^{-1}$	IR Térmico	Ventana y Bandas de Absorción

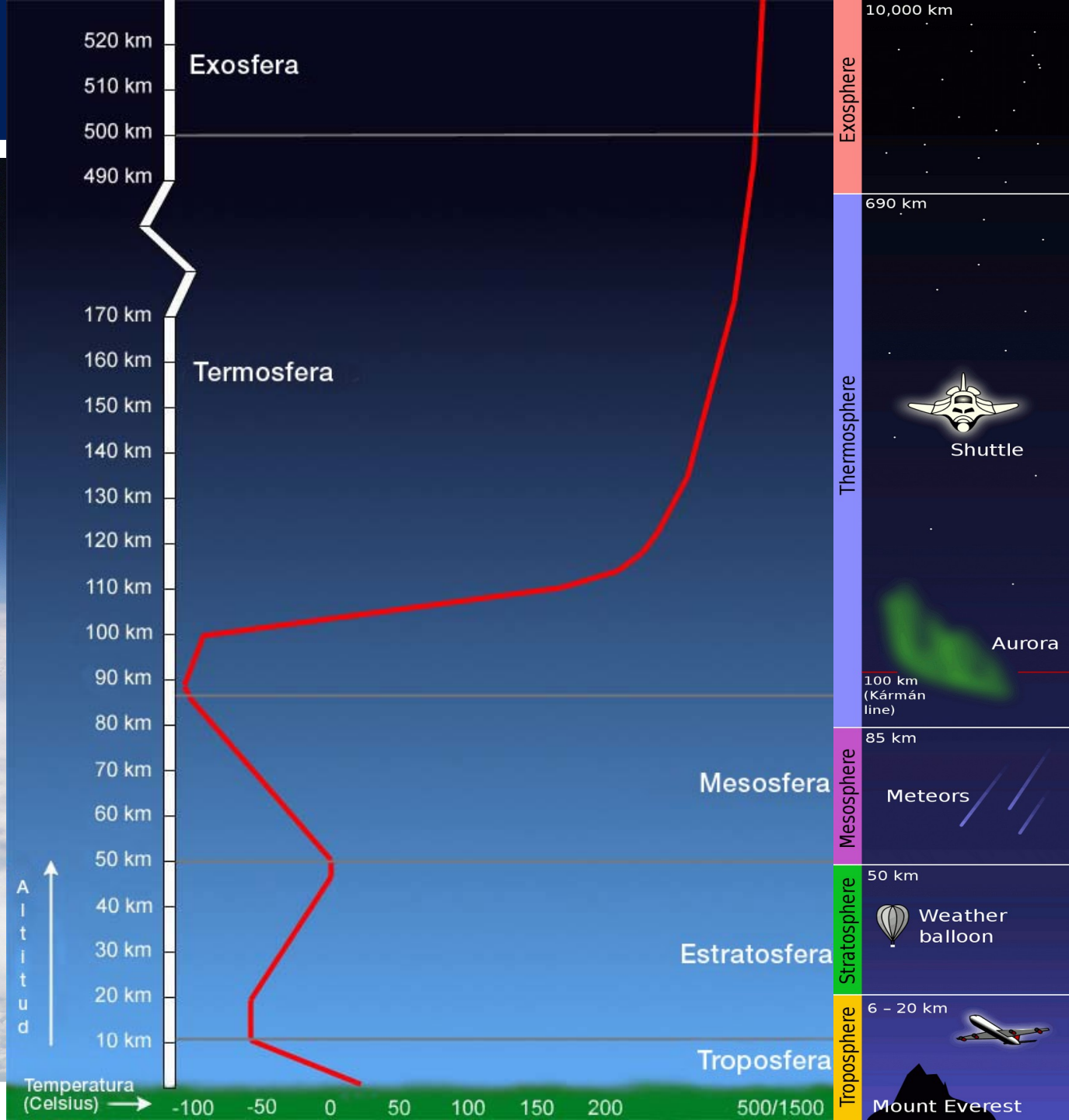
Permite obtener perfiles verticales de **temperatura** con una precisión de **1K por 1Km** y de **humidad** con **15%** en la troposfera



# The atmosphere

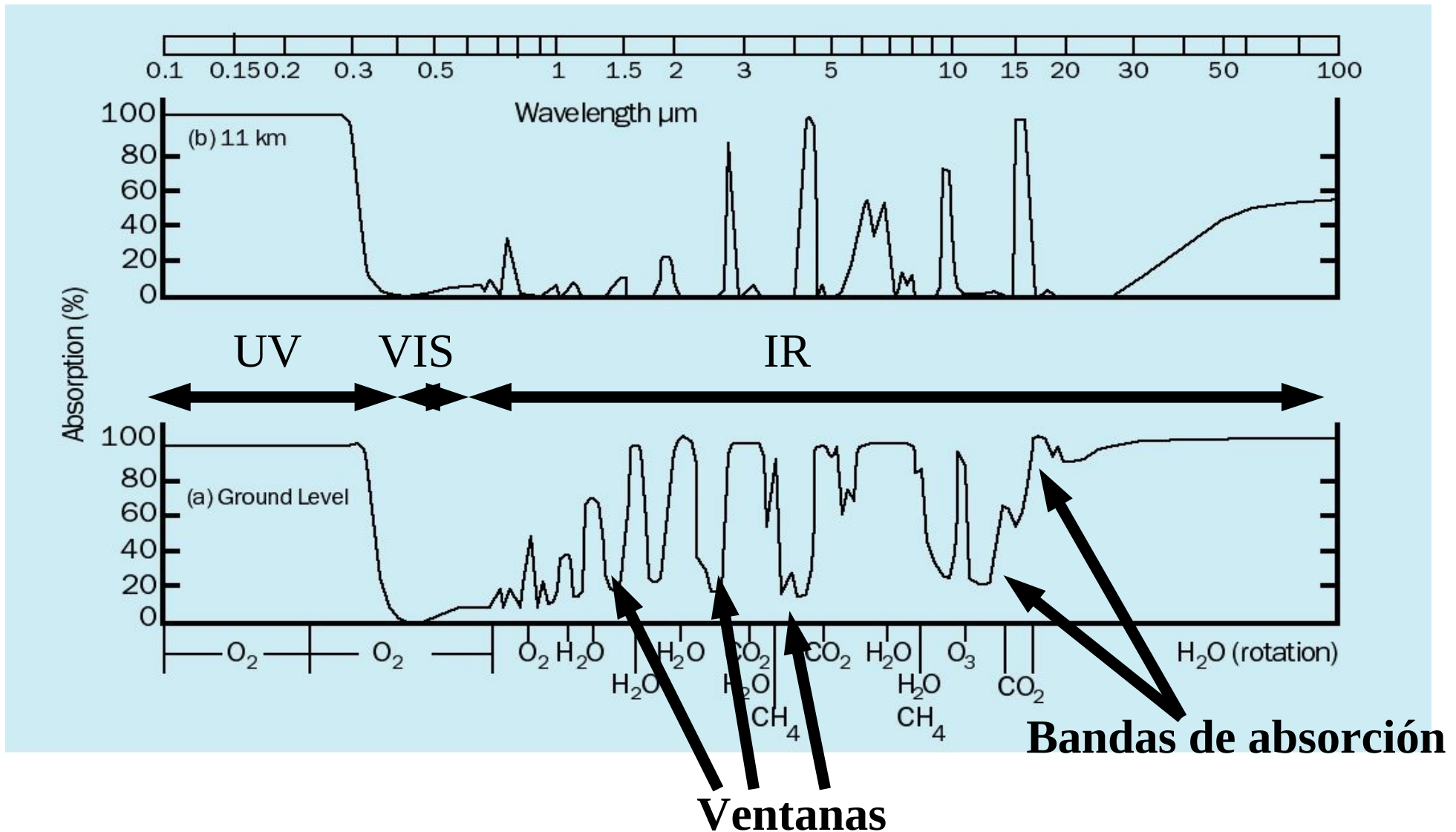


# The atmosphere

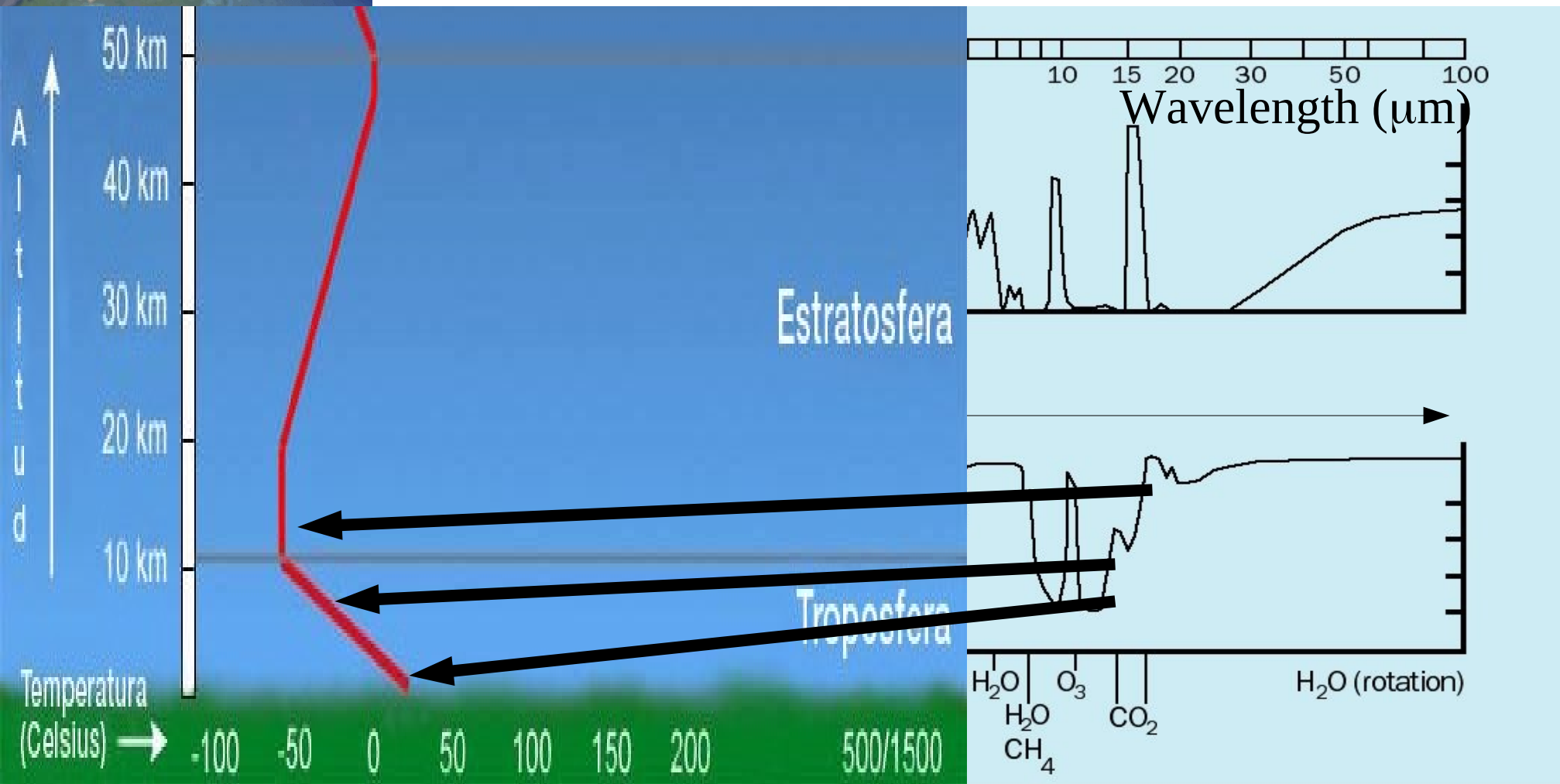
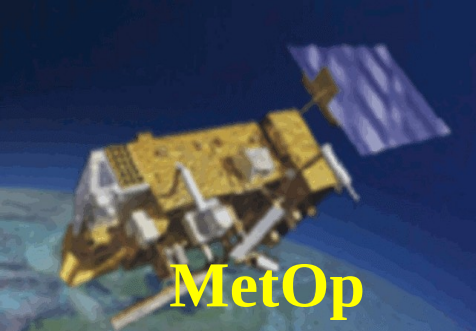


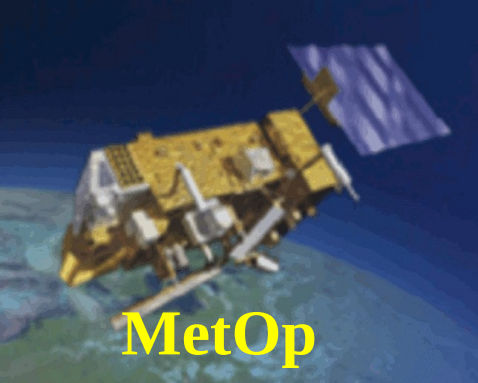


# Atmospheric light absorption

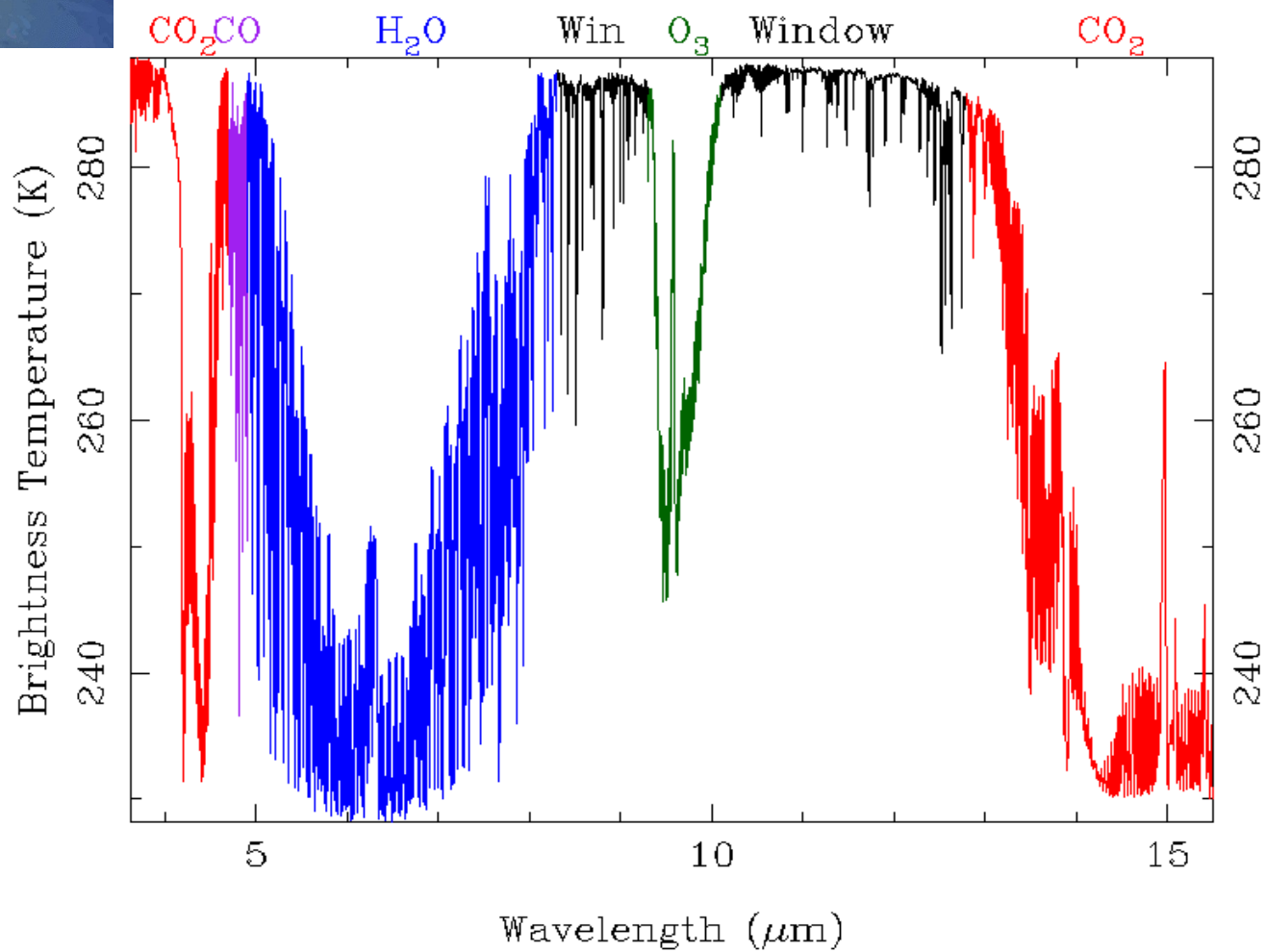


# MetOp IASI: working principle



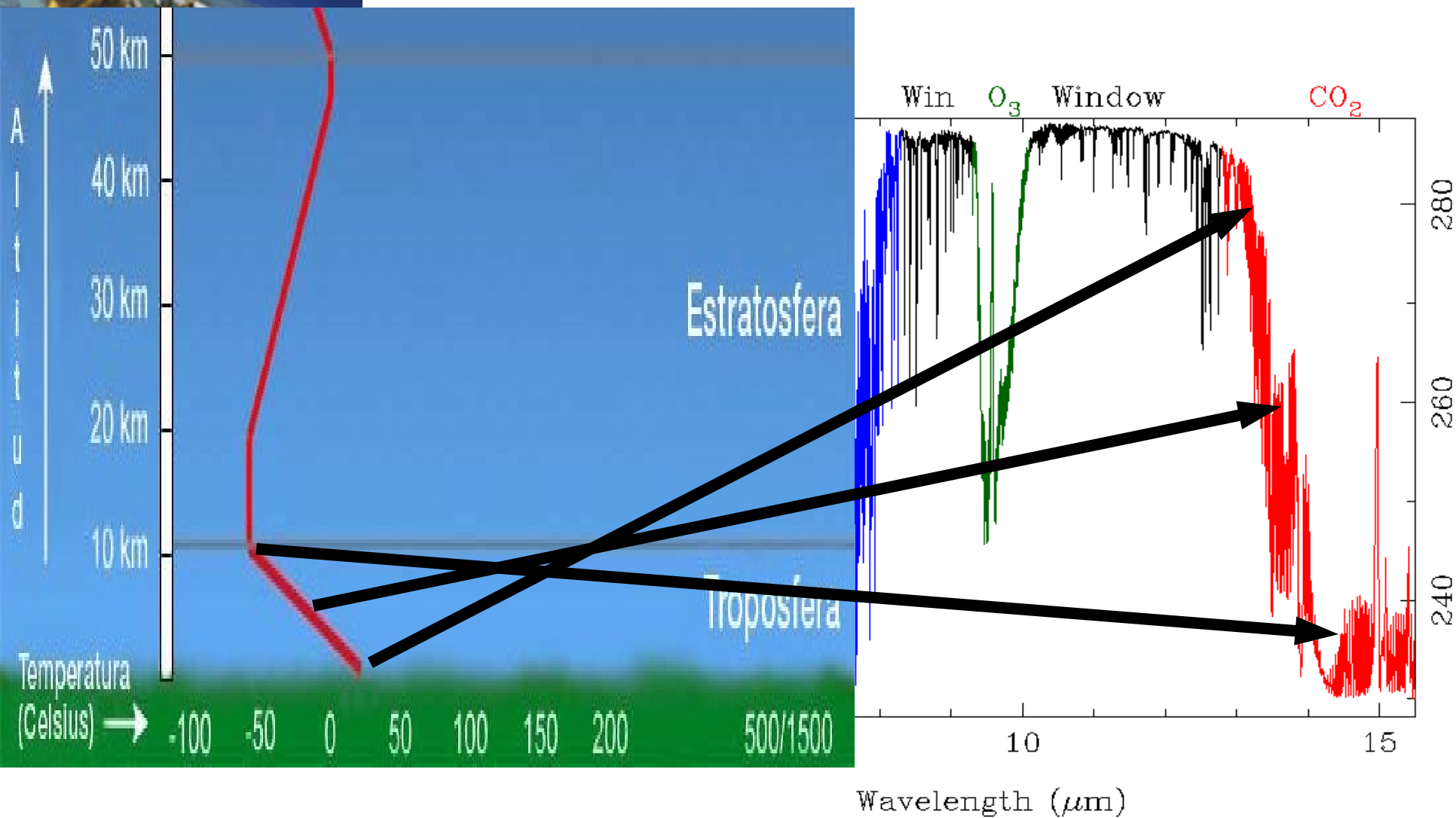


# IASI: Spectrum



MetOp

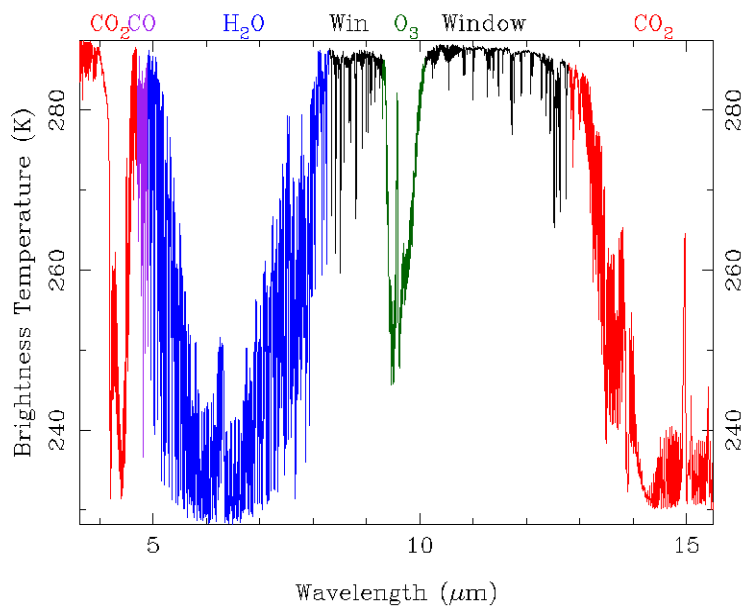
# IASI: Working Principle



MetOp

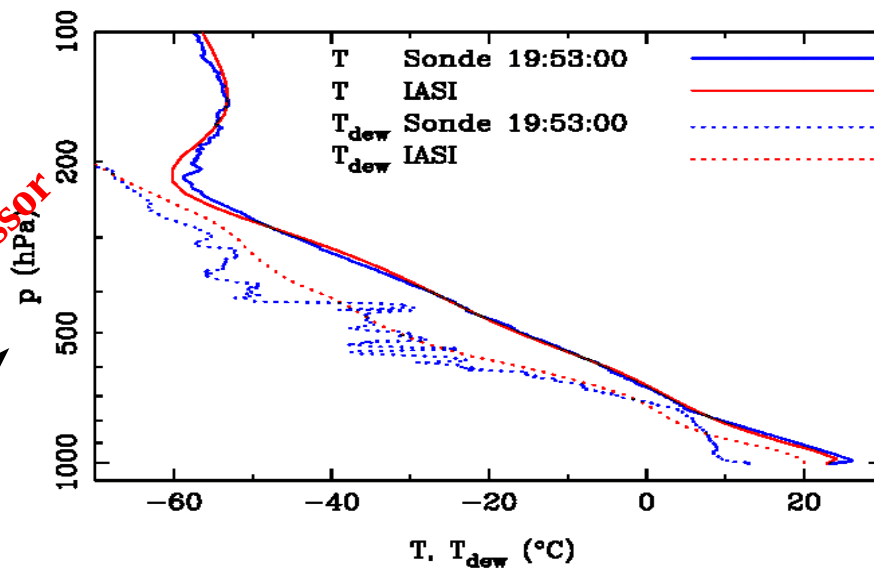
# IASI: Processing

Radiancias = Level 1 (L1)

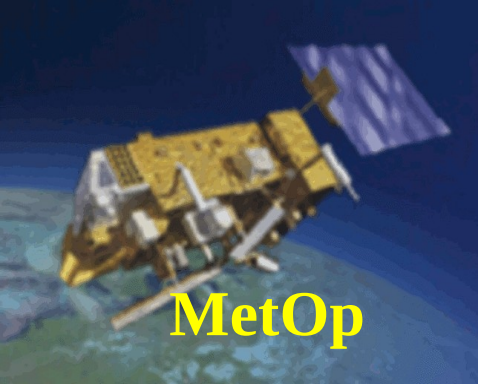


Level 2 Processor

Lindenberg 2007/06/08 19:58:01



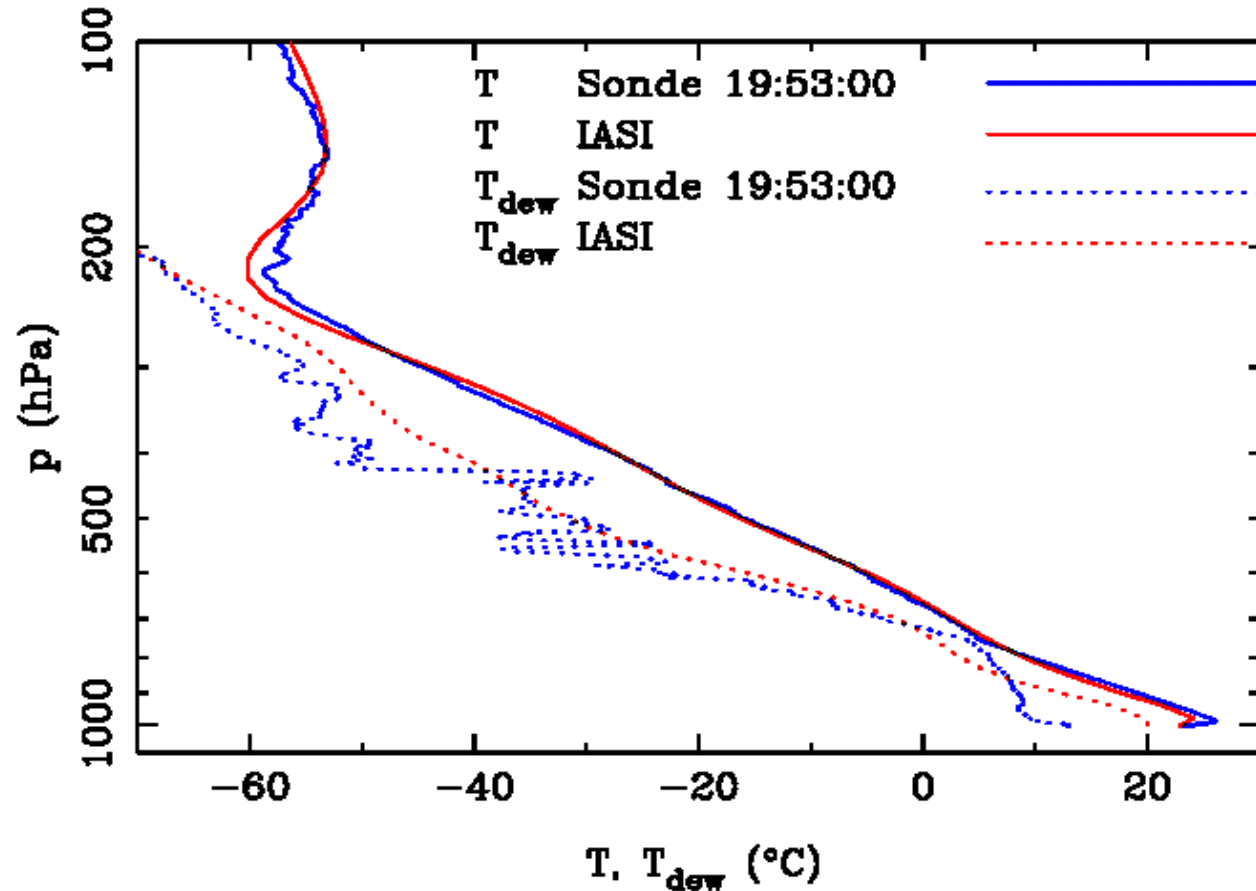
Perfiles = Level 2 (L2)



Metop-A, IASI  
2007/06/08  
Lindenberg

# MetOp IASI: vertical profile

Lindenberg 2007/06/08 19:58:01



- MTG-IRS (IASI) profiles are much smoother than radiosondes
- Lower levels have high accuracy → Complement with surface station data?

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Thank you!! More info: [safnwchd@aemet.es](mailto:safnwchd@aemet.es)