

# EUMETSAT's IRS L2 Cal/Val and monitoring activities

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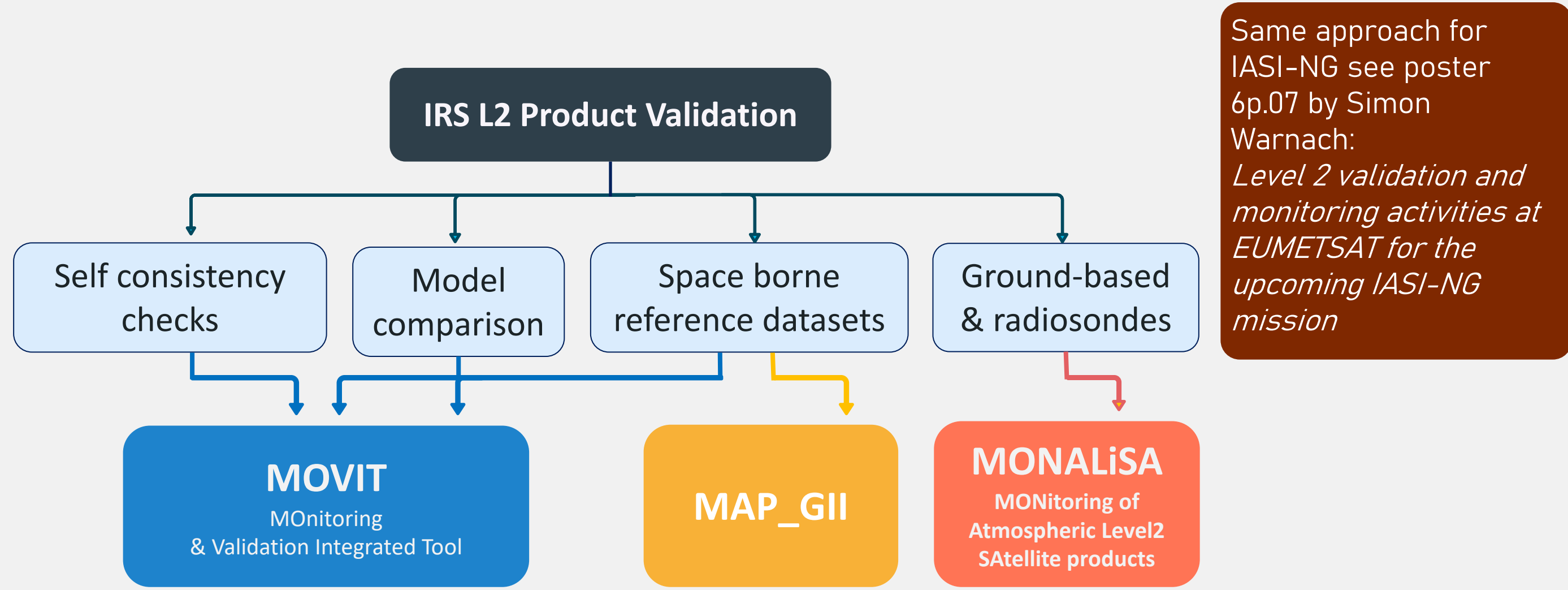
## Introduction

The upcoming Infrared Sounder (IRS) aboard the Meteosat Third Generation sounding satellite (MTG-S) is designed to significantly enhance weather forecasting capabilities by providing high-resolution, four-dimensional data on atmospheric temperature, water vapor, and ozone profiles along with cloud information, surface emissivity, and instability indices. Operating with high vertical, horizontal, and temporal resolution (every 30 minutes over Europe), IRS aims to improve the accuracy of numerical weather prediction (NWP) models, leading to more reliable forecasts. To ensure the effectiveness of IRS measurements for accurate forecast models, the quality of L2 products requires rigorous validation and continuous monitoring. EUMETSAT has developed dedicated offline monitoring tools—MOVIT (MONitoring & Validation Integrated Tool), MONALiSA (MONitoring of Atmospheric Level2 SATellite products) and MAP\_GII (MAPs for Global Instability Indices)—for this purpose. These toolkits will undertake thorough validation during the commissioning phase of IRS and will continue to serve as a routine monitoring tool, thereafter. This poster outlines EUMETSAT's end-to-end Cal/Val strategy for IRS, highlighting the role and synergy of MOVIT, MONALiSA, and MAP\_GII in maintaining and monitoring data quality throughout the mission lifecycle.

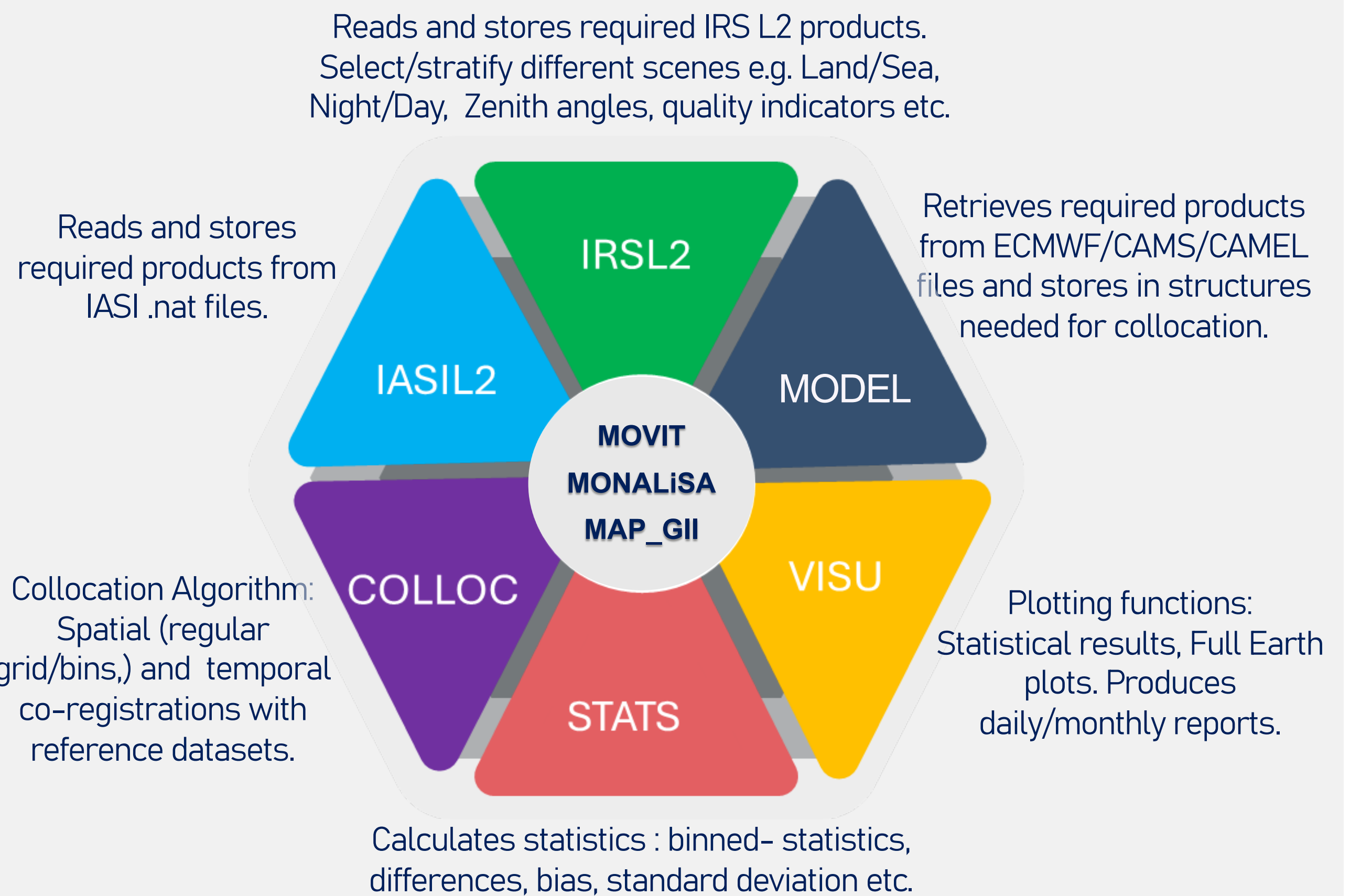
## IRS L2 Cal/Val Strategy

The MTG-IRS L2 Cal/Val strategy ensures Level 2 product accuracy by calibrating retrieval algorithms and validating results against EUMETSAT standards.

Validation relies on comparisons to numerical models (e.g., ECMWF for T, q, and Ts, CAMS for GHG/air quality), satellite datasets (e.g., IASI L2, MSG SEVIRI), and in-situ measurements (e.g., radiosondes, Lidars). Statistical metrics like bias and standard deviation are computed for each Local Area Coverages (LACs) and the full-disk views produced in line with the LAC acquisition cycle (full LAC in 15 minutes, LAC4 revisited every 30 minutes). The approach combines existing IASI tools (MAP\_GII and MONALiSA) with new methods tailored to MTG-IRS requirements.



## Sub-modules



## MOVIT : MONitoring & Validation Integrated Tool

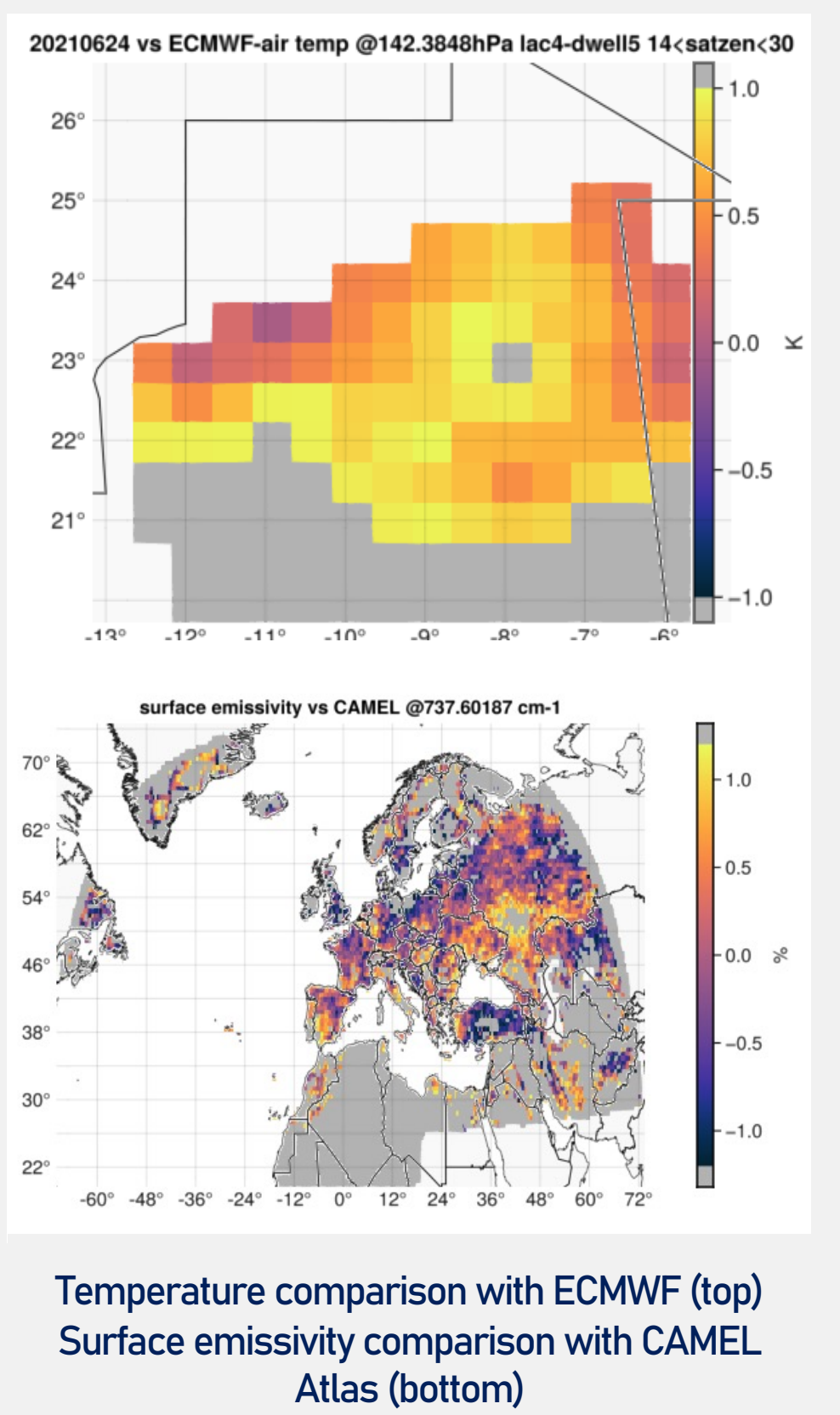
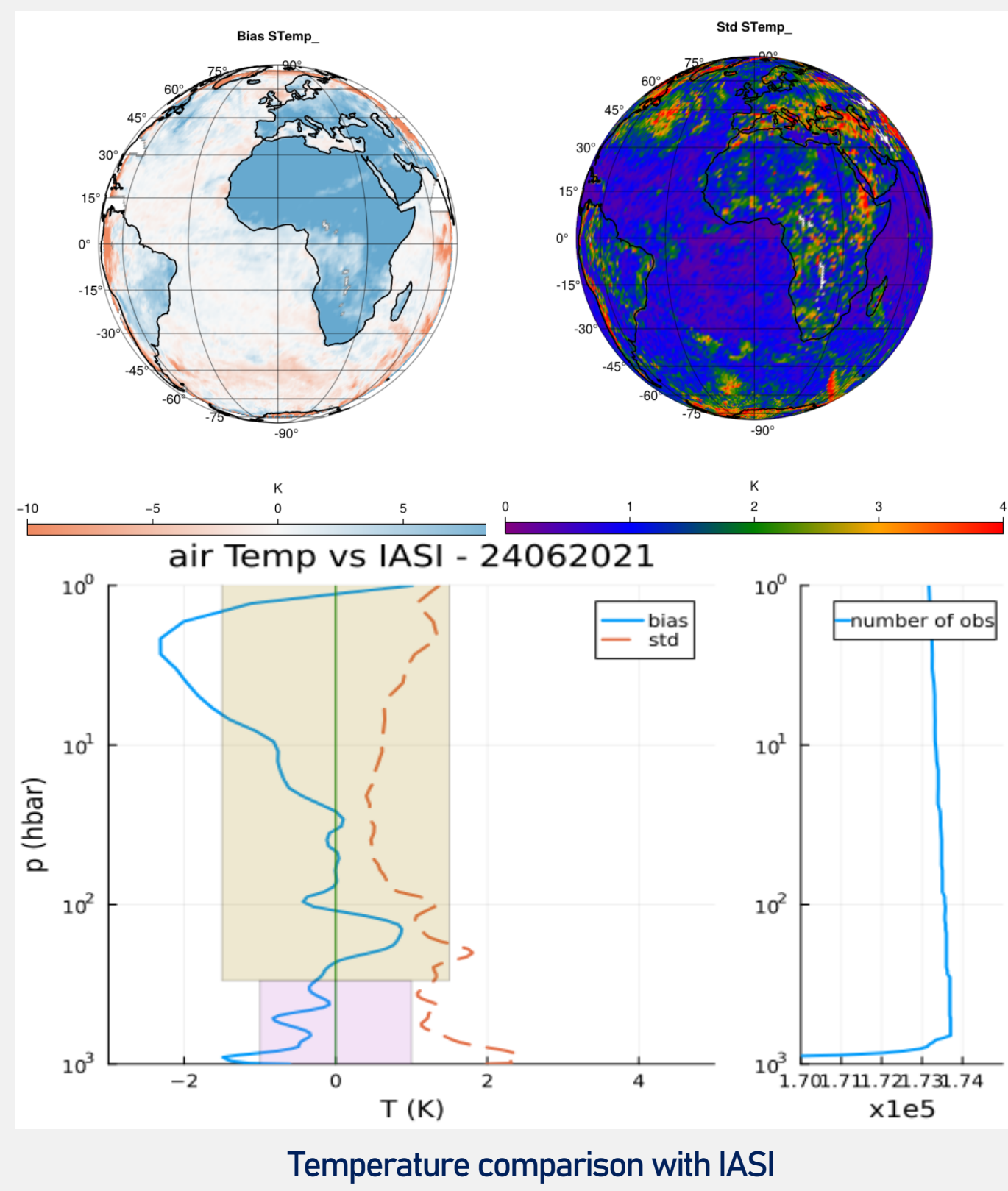
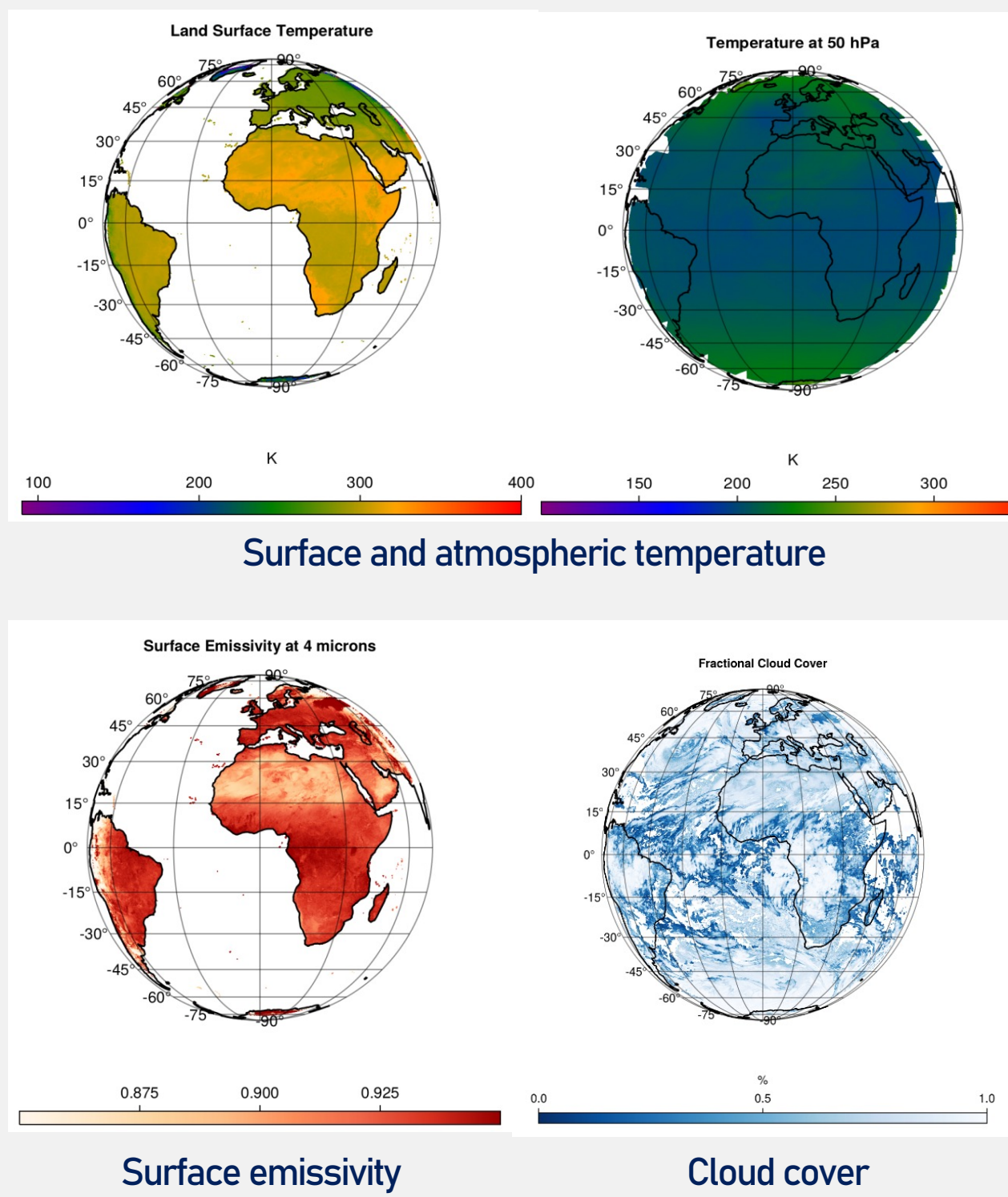
MOVIT is a comprehensive toolbox designed to prepare for the commissioning of MTG-IRS L2 products. Building upon the IMOEN, MOVIT functions as a modular toolkit that can be integrated into a processing chain to meet the monitoring requirements.

### Development:

- Developed from scratch to address unique granularity handling and detector geometry of MTG-IRS compared to EPS instruments.
- Aimed at ensuring sanity checks, consistency tests, and validation of the operational L2 processor outputs on daily and monthly basis.

### Application:

- Sanity and Consistency Checks** – to discover unexpected features like discontinuities, aberrant values, and interruptions
- Numerical Data Comparisons** – atmospheric and surface data from ECMWF (T and q), CAMEL Atlas (LSE) and CAMS (GHS).
- Spaceborne Reference Dataset Comparisons (IASI L2)** – focusing on surface, vertical profile, and cloud characterization retrievals.



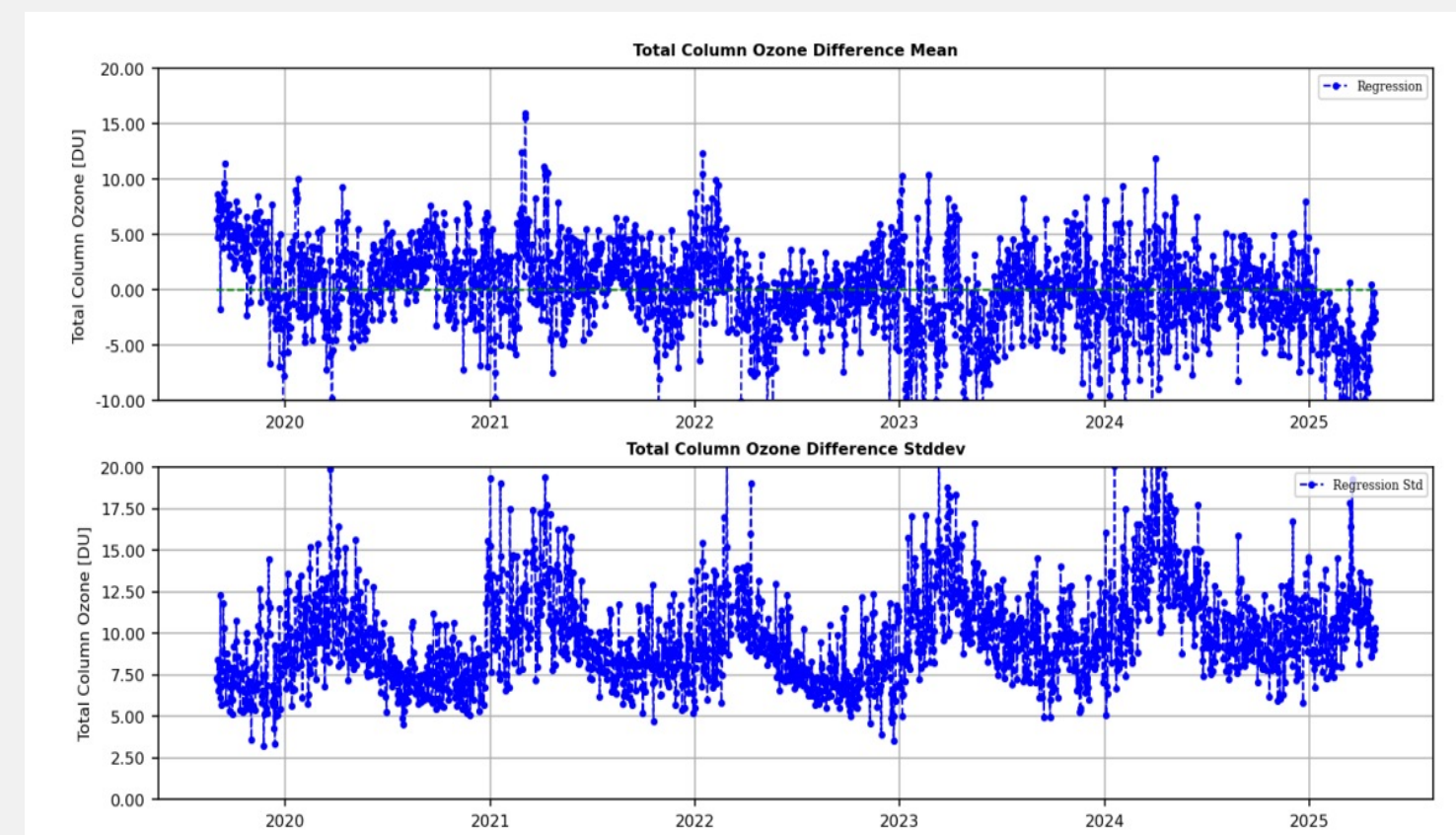
## MONALiSA : MONitoring of Atmospheric Level2 SATellite products

MONALiSA is a dedicated tool to monitor and validate atmospheric products using ground-based reference data.

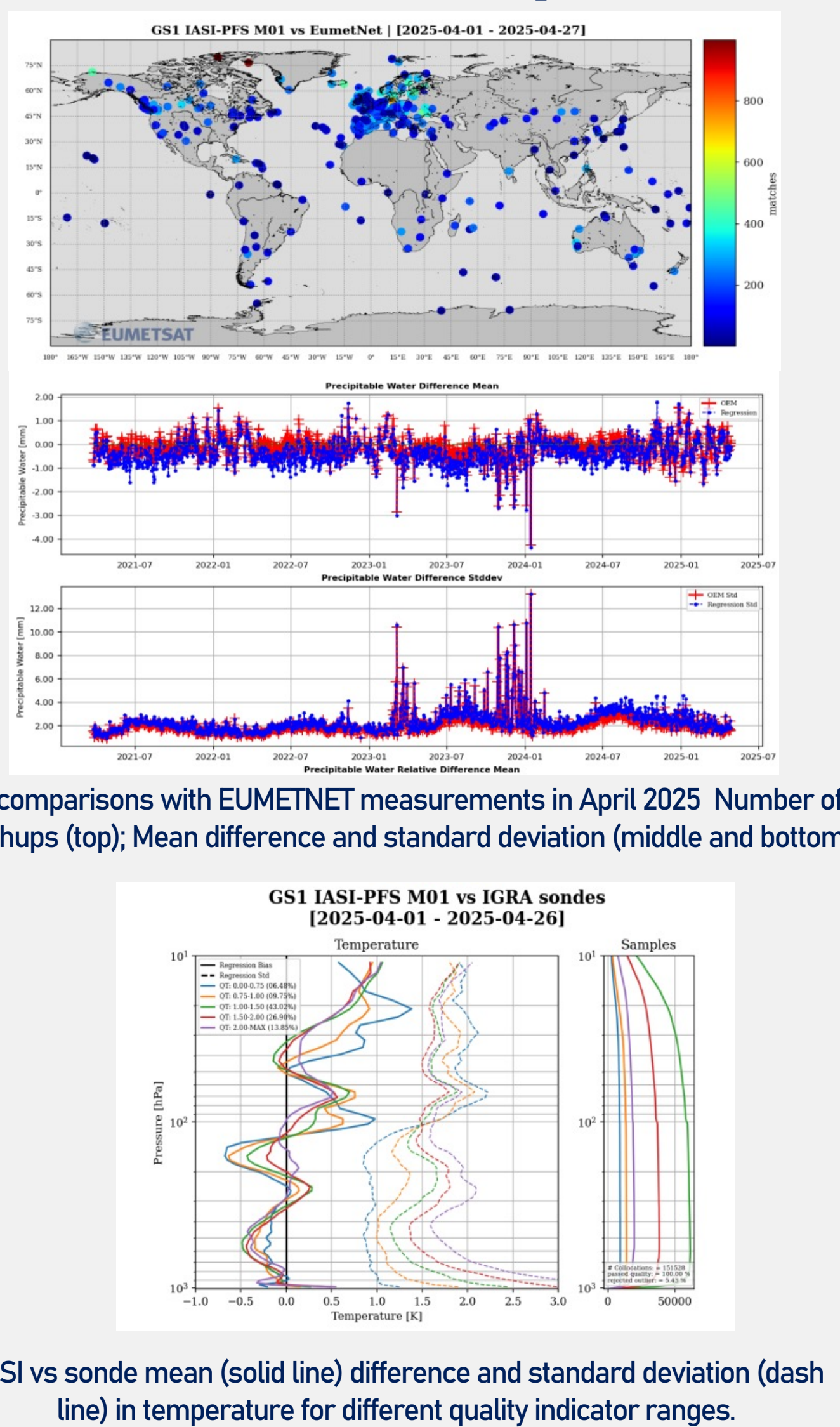
Provides daily reports and long-term time series studies.

### Key Tests:

- Temperature profiles / humidity profiles against IGRA sonde measurements
- Integrated water vapour against EumetNet data
- Ozone measurements against EuBrewNet data



For aircraft based validation see poster 6p.08 by Validation of IASJose Luis Villaseca Nadal:  
*Validation of IASI Temperature and Humidity using 11 years of airplane (AMDAR) measurements*



## MAP\_GII : MAPs of Global Instability Indices

MAP\_GII is a visual tool for monitoring & validation of IRS/IASI/IASI-NG cloud products and instability indices (e.g., CAPE, KO-index).

### Key Products:

Integrated Water Vapour, Land/Sea/Ice Surface Temperature, Cloud products, Global Instability Indices

### Reference Data:

FCI, METimage (L1 RGB, L2), SEVIRI (LSA SAF), EarthCARE, TROPOMI/S5P, VIIRS

### Validation Methods:

- Daily visual inspections using RGB (FCI/METimage) / KML (Google Earth) overlays
- Statistical Intercomparison - L2 cloud stats vs. active sensors, LST vs. SEVIRI

