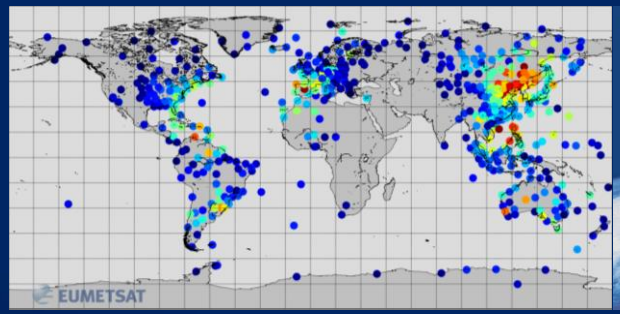
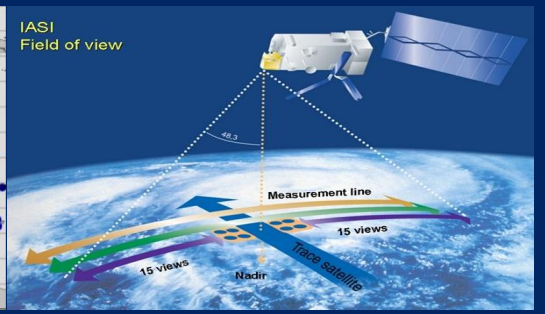




Validation and operational monitoring of atmospheric products derived from IASI measurements.

Stefan Stapelberg, T. August, A. Burini , D. Coppens, M. Crapeau,

T. Hultberg, F. Lenti

Overview of the Talk

The Infrared Atmospheric Sounding Interferometer Instrument IASI

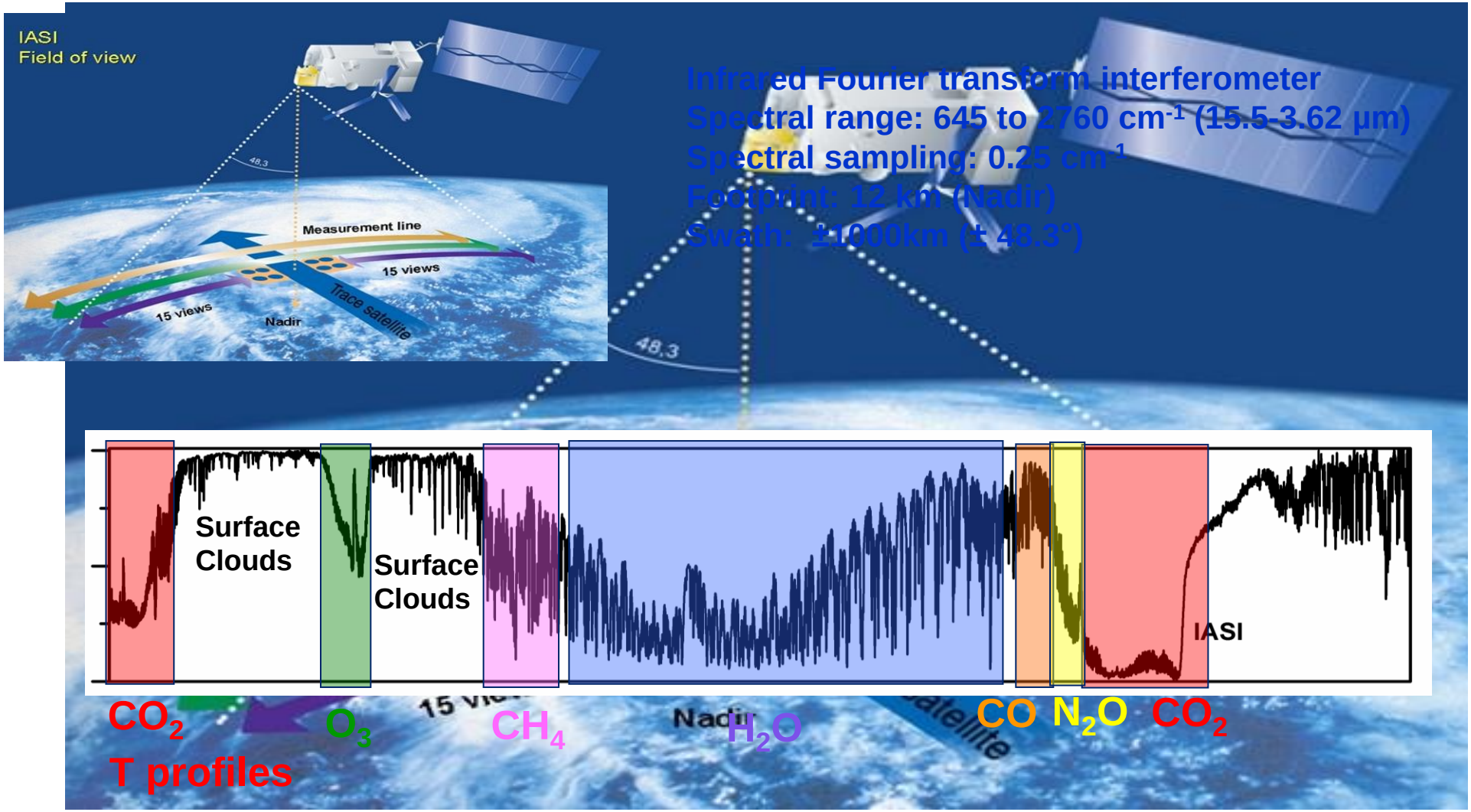
The IASI Level 2 product processing

Introduce 2 operational evaluation schemes

- T/q profiles monitoring tool MONALiSA
- Cloud products validation/ inter-comparison tool
  - ✓ Visual inspections with the help of satellite imager
  - ✓ Validation with active satellite based sensors

Summary

The IASI instrument



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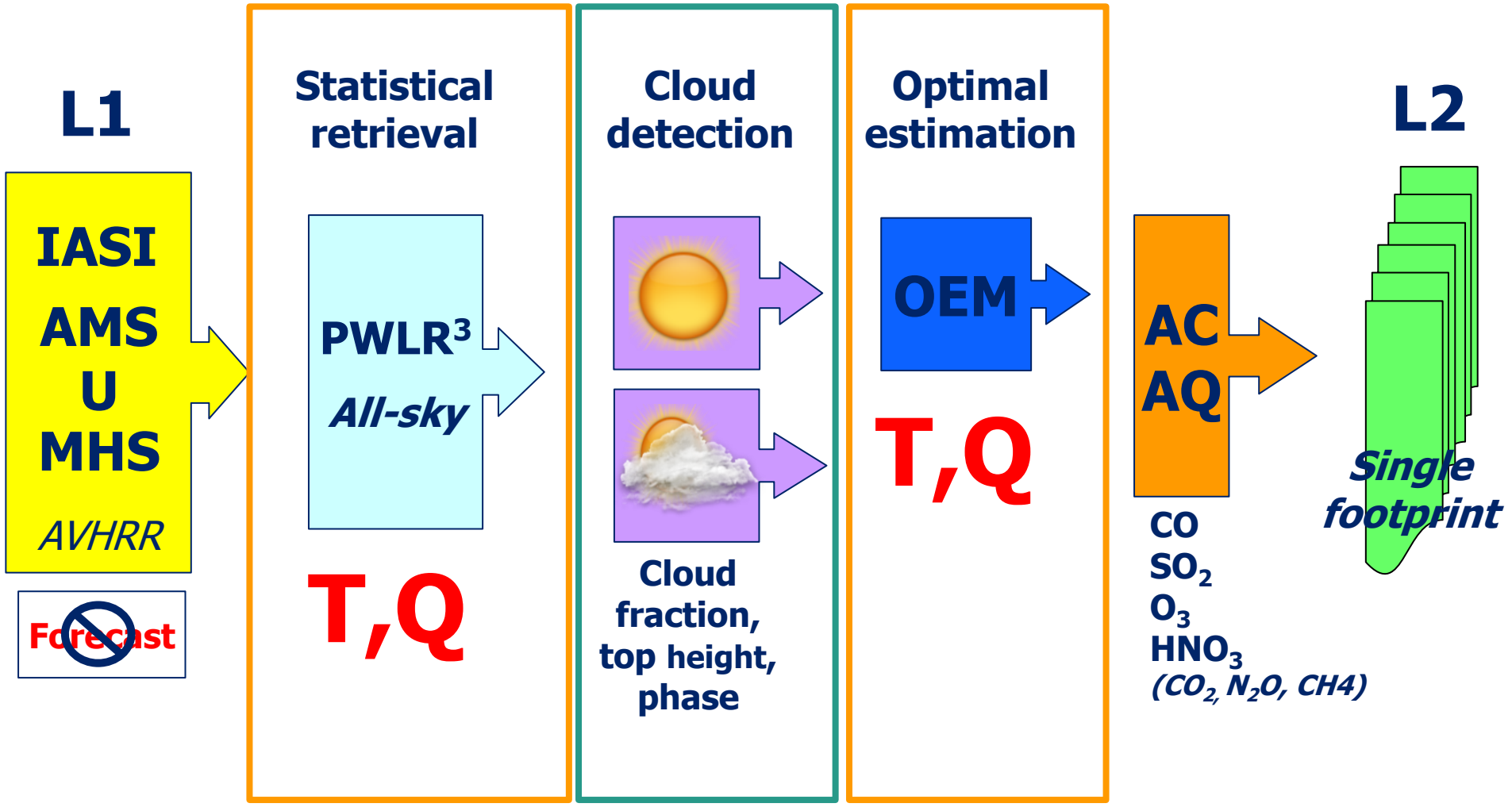
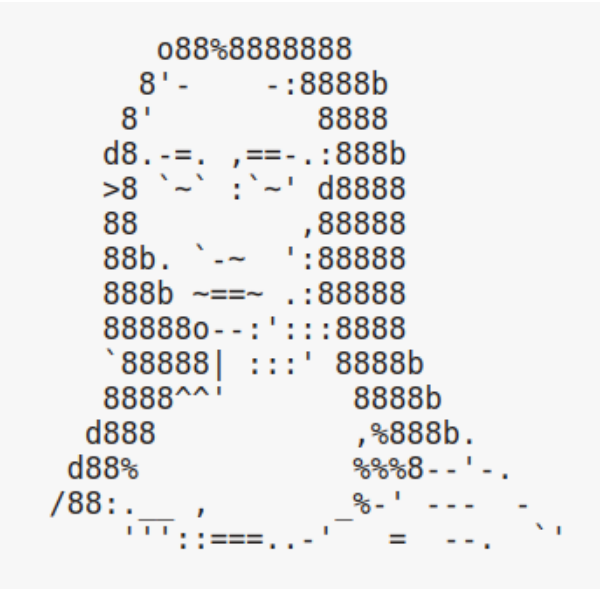
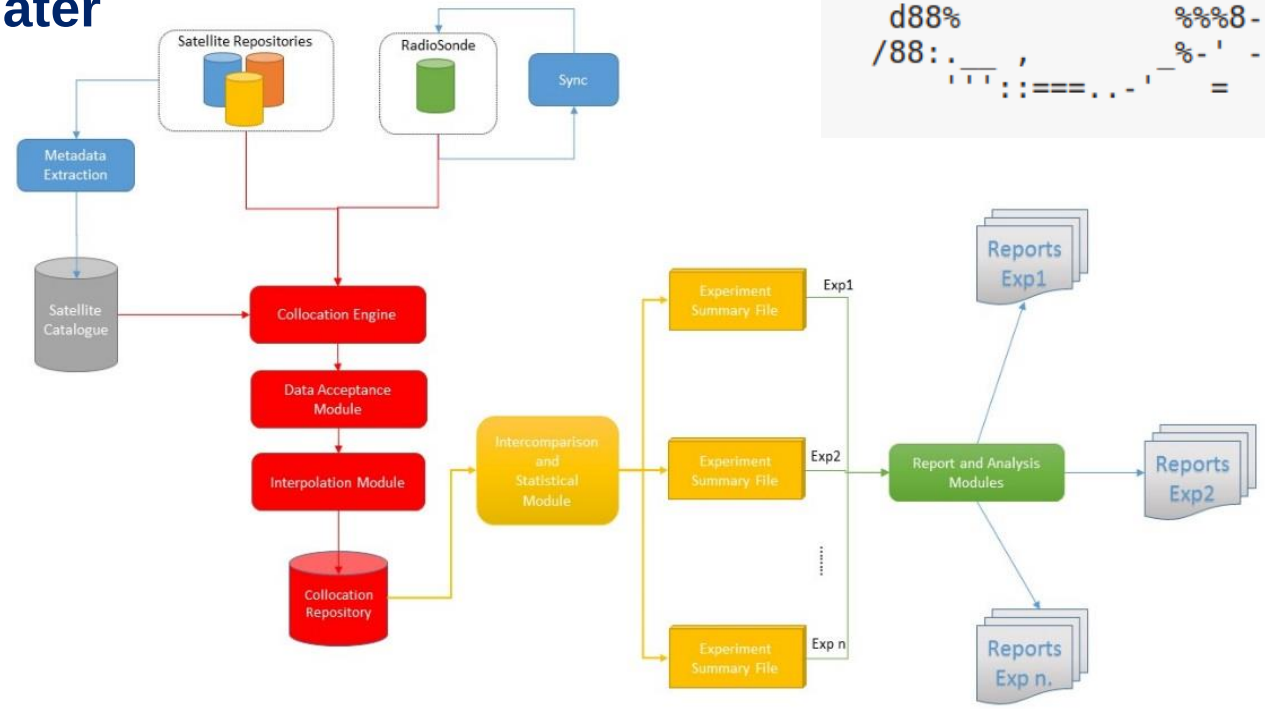
IASI Level 2 product processing facility PPF



MONitoring of Atmospheric Level2 SAtellite products

- **MONALiSA (**python package)
- provides an operational environment for the validation / verification of satellite L2 profiles (**Temperature** and **Water Vapour**) with in situ measurement (**radiosonde IGRA database**)

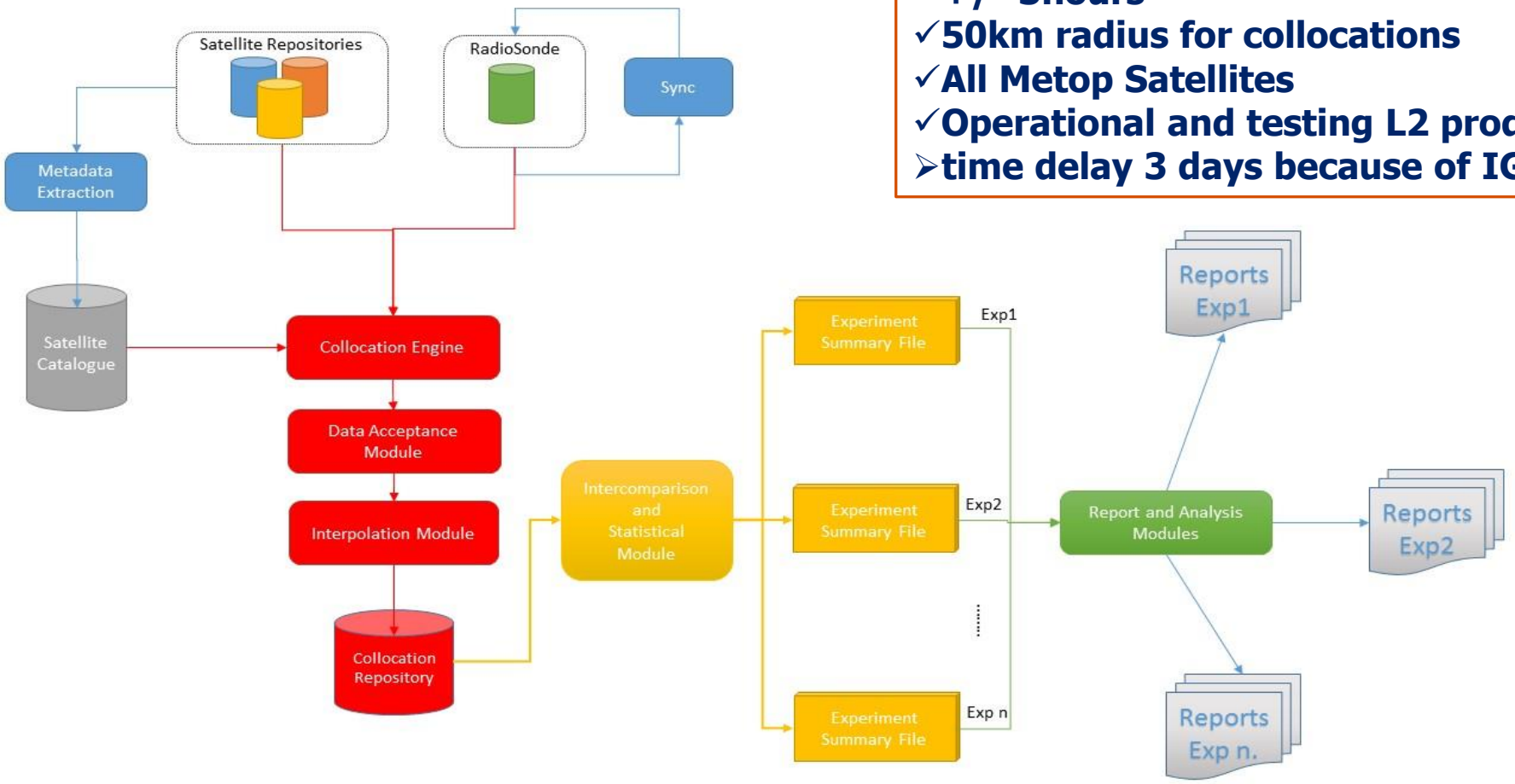




The processing concept :

5. Report and Analysis Module – Module for the generation of reports and plots

- ✓+/- 3hours
- ✓50km radius for collocations
- ✓All Metop Satellites
- ✓Operational and testing L2 products
- ➢time delay 3 days because of IGRA



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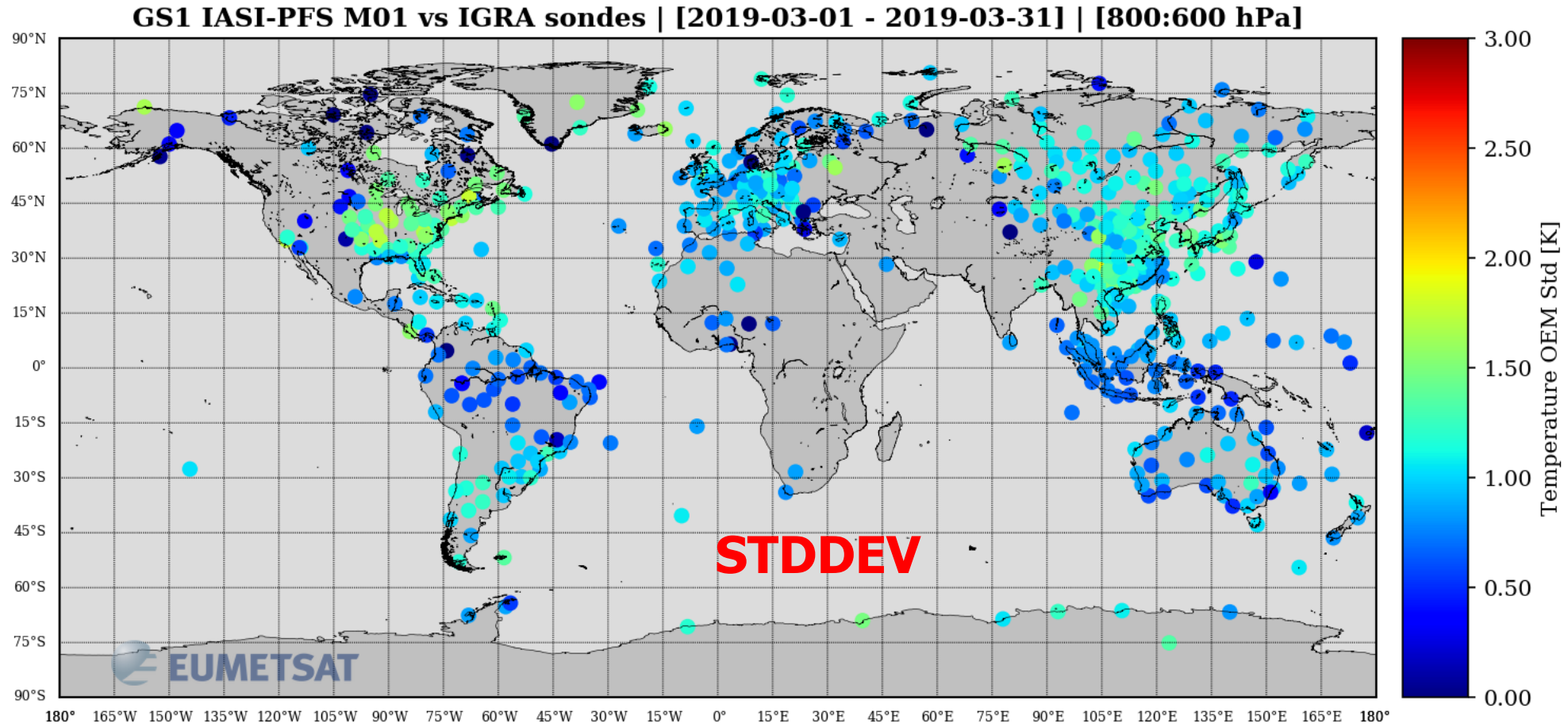
MONALiSA Examples: IGRA Stations matches



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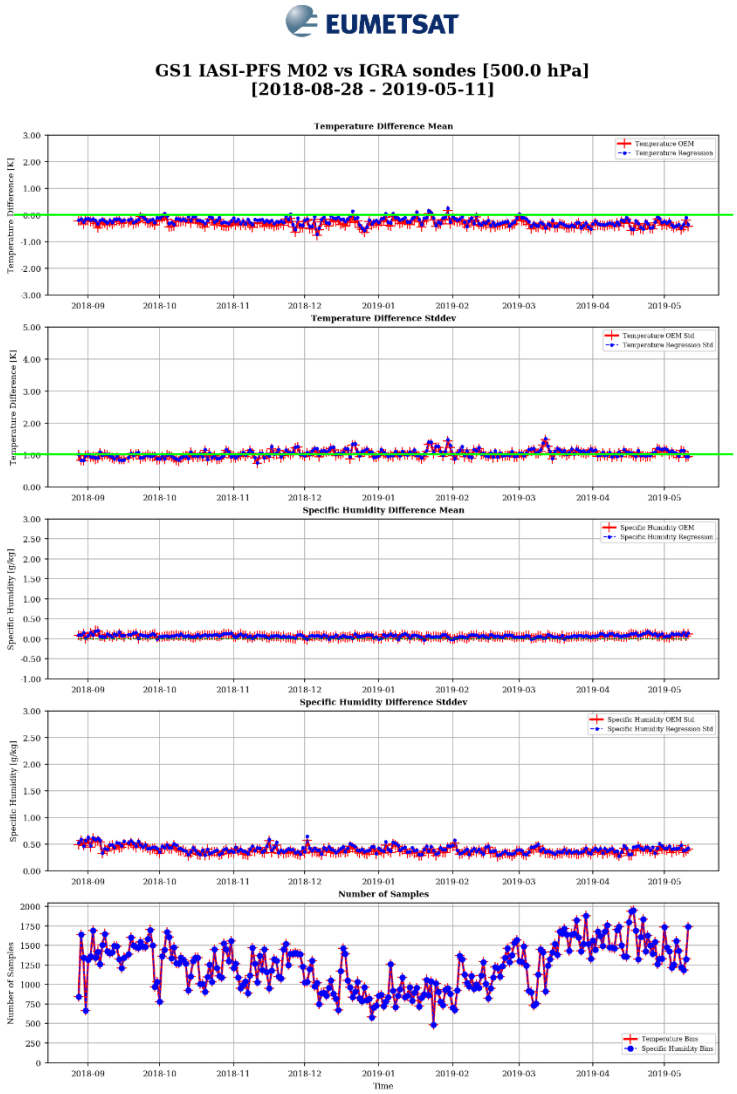
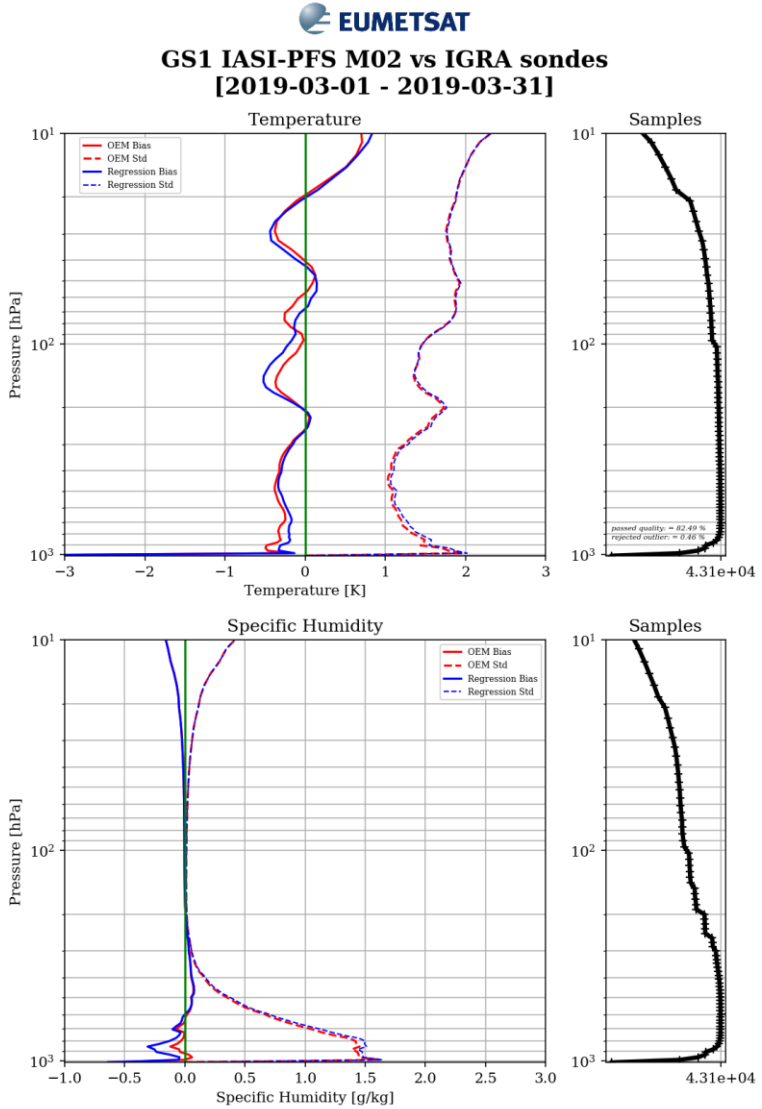
MONALiSA Examples: Profiles and Time series

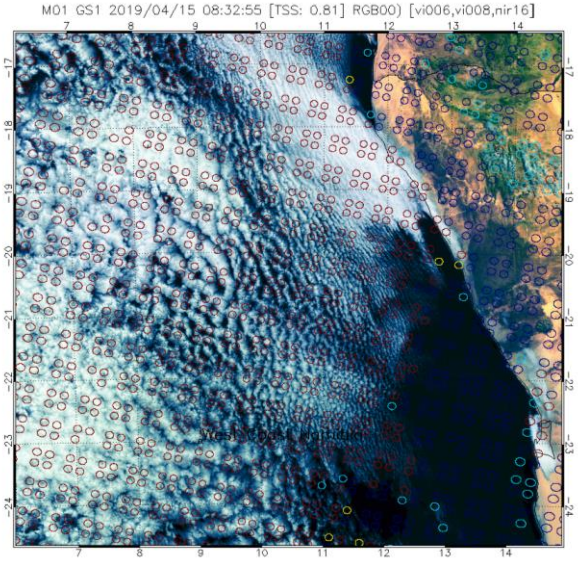


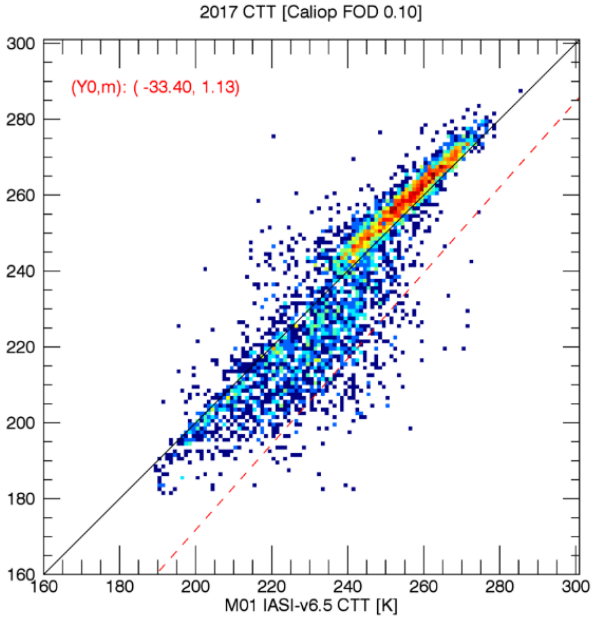


Monitoring / Evaluating IASI Cloud Products

- 2 main schemes
  - Case Study approach - to provide visual inspections of IASI L2 products on top of AVHRR based RGB'S
  - Intercomparison and validation approach including statistical evaluation with active satellite sensors

- Applications:
  - ✓ Automated overpass detection (MYSQL)
  - ✓ Global Instability Indices , e.g. CAPE, KO-Index
  - ✓ Cloud products Validation, e.g. Cloud detection, Cloud Top
  - ✓ Collocation collection to establish dataset that can be used for for **Caliop Validation**





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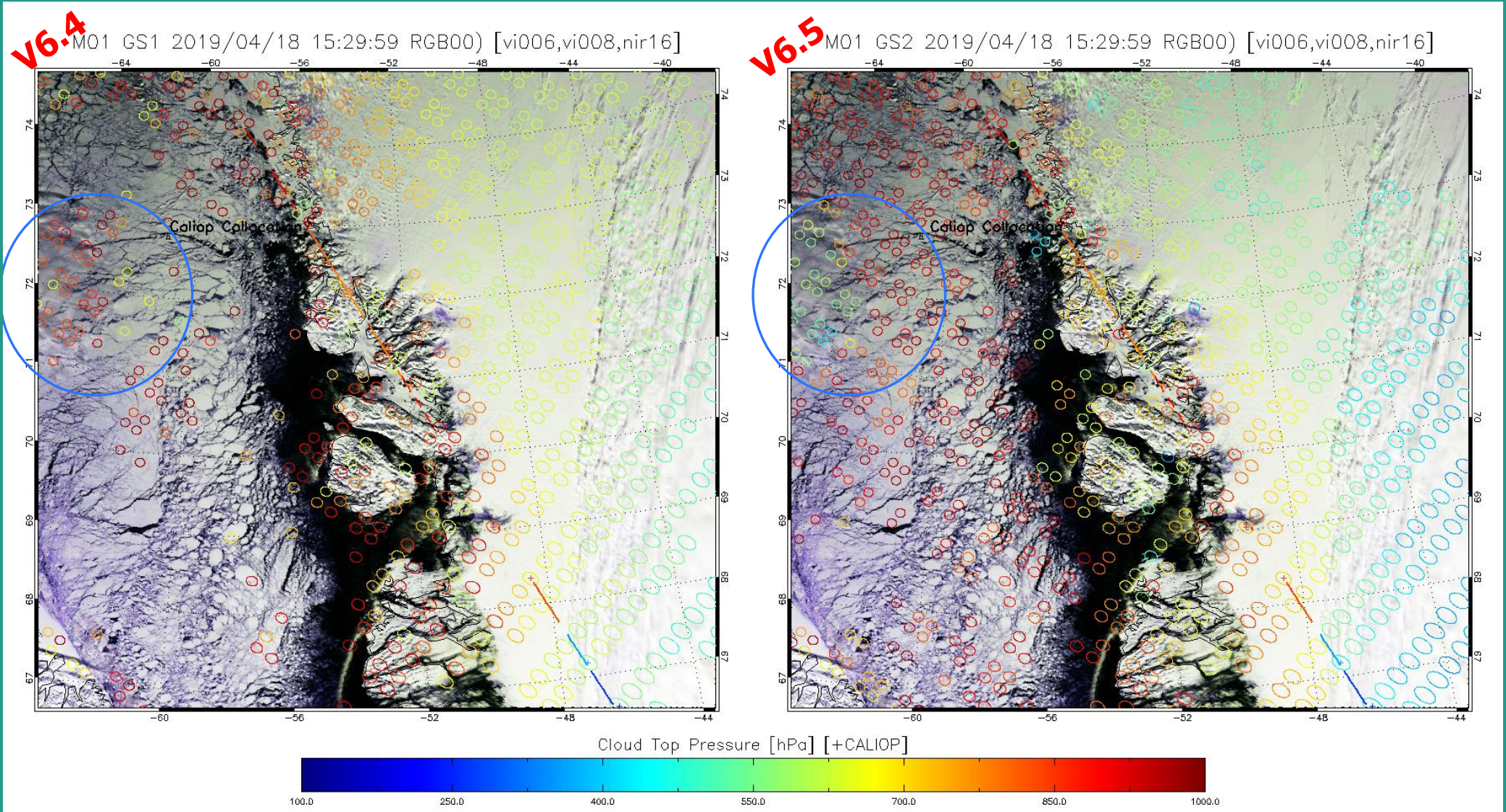
Case Study Example: Cloud detection over Ice incl. Caliop Track



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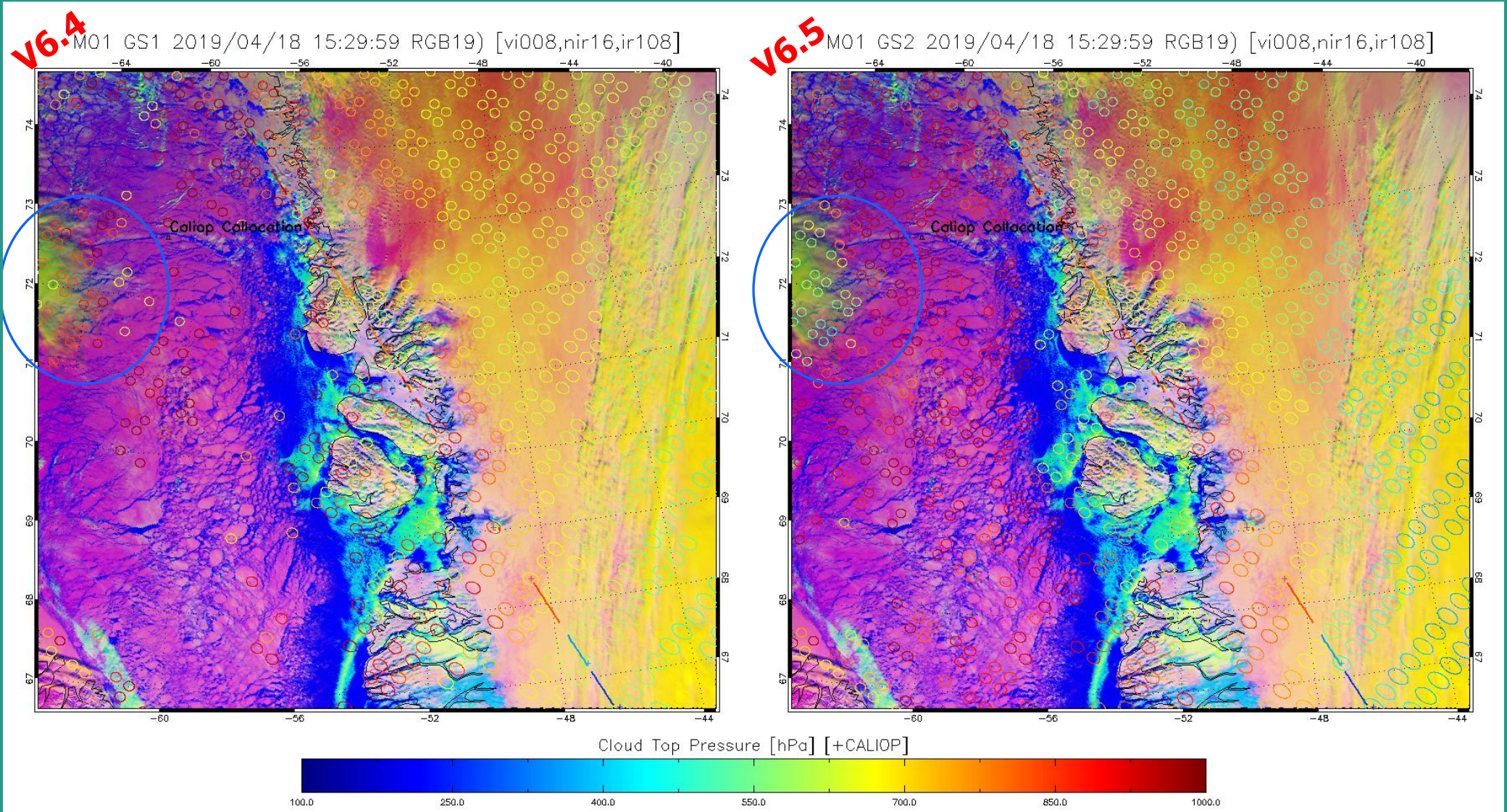
Case Study Example: Cloud detection over Ice incl. Caliop Track



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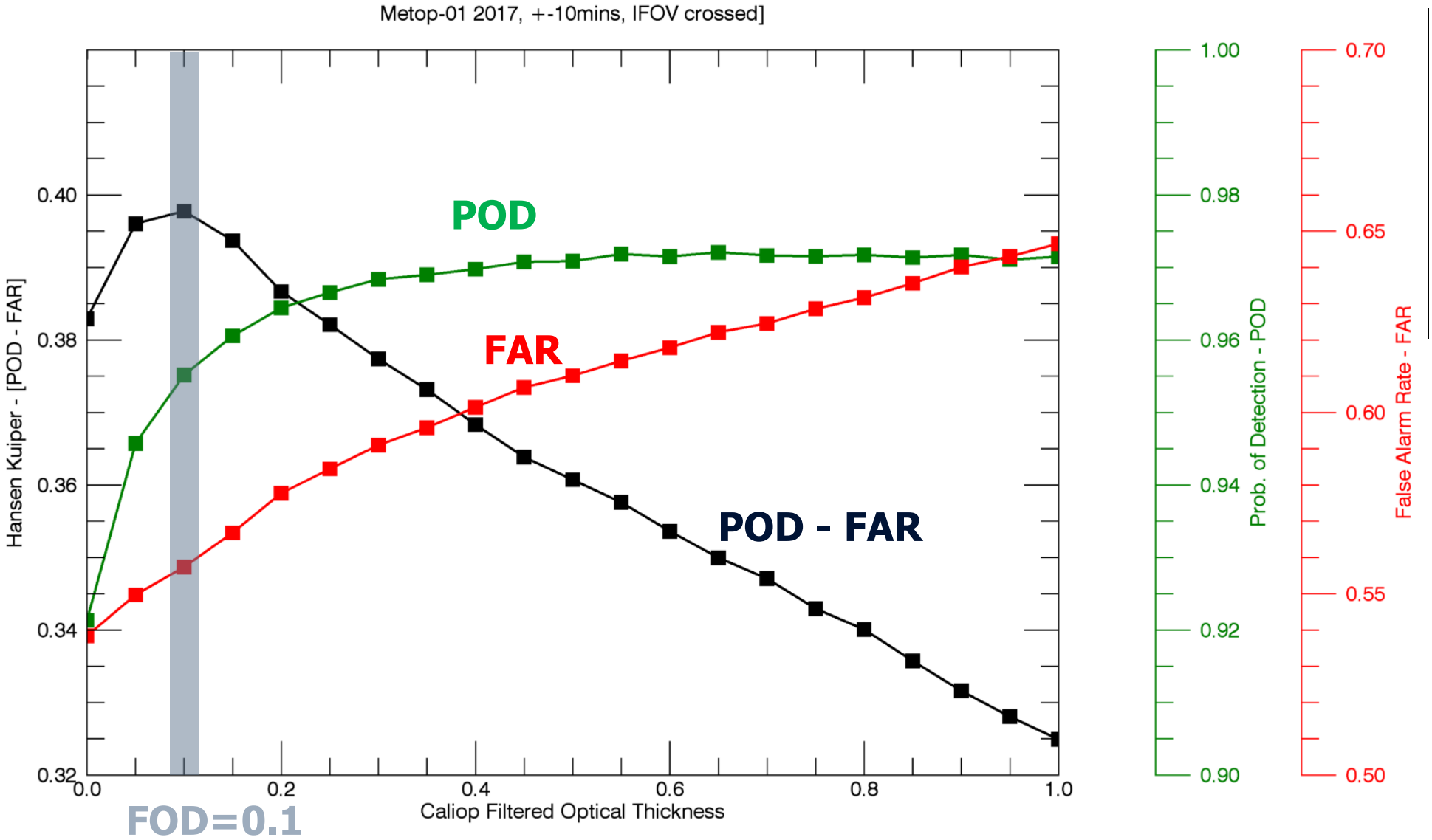
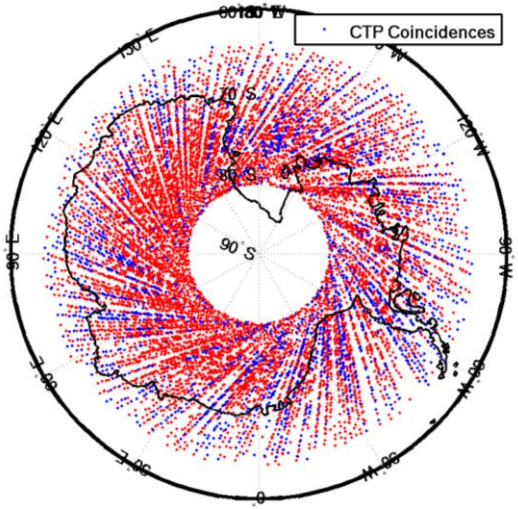
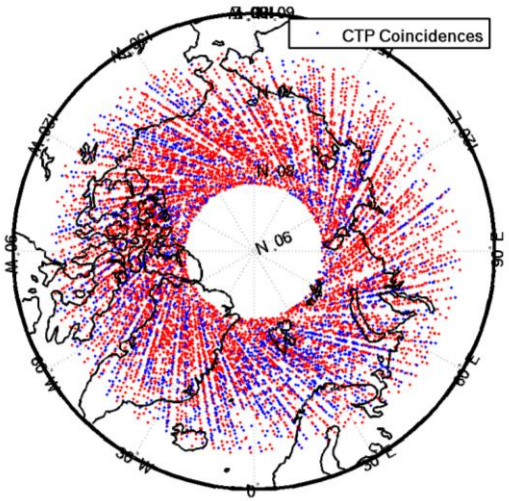
Validation with CALIOP: Caliop Versions and Sensitivity

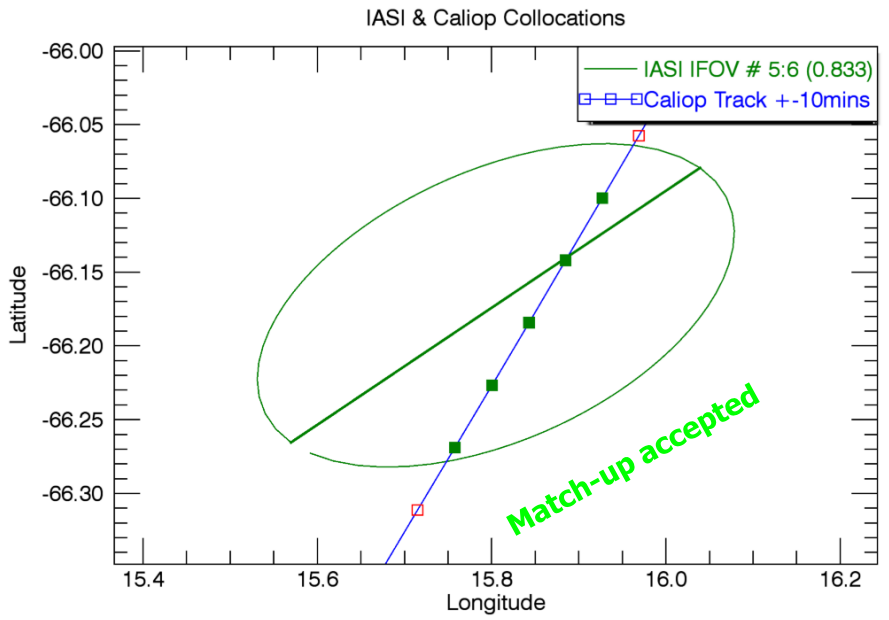
- 

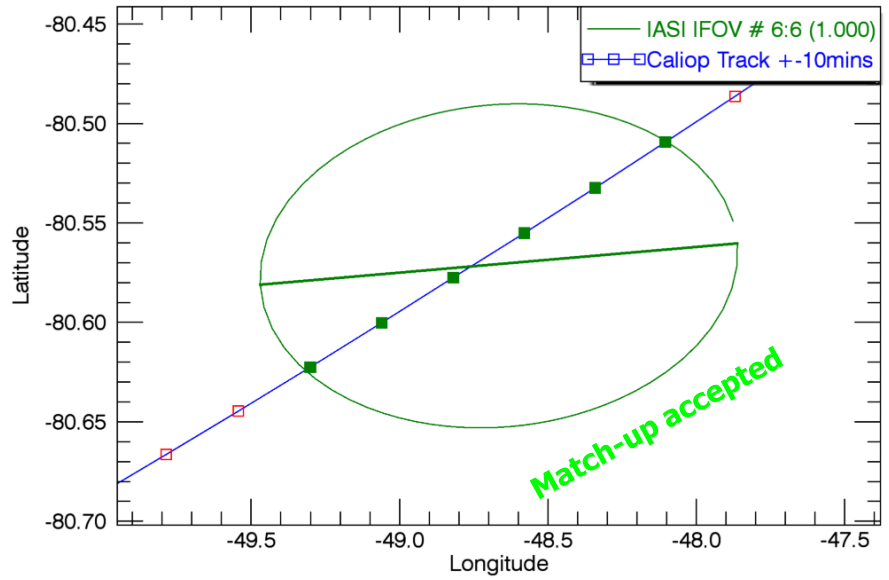
Validation with Caliop: Collocation

- IASI: the Pixel size of IASI depends on the satellite zenith- and azimuth angle and on the satellite height. The result is an ellipse, shown exemplary in both figures (right) with stars, calculated on 72 (every 5°) sampling points.
- CALIOP: collocation is true if Caliop 5km L2 Track crosses the IASI IFOV (green squares).
- Limitations: different orbits allow collocations only in higher latitudes

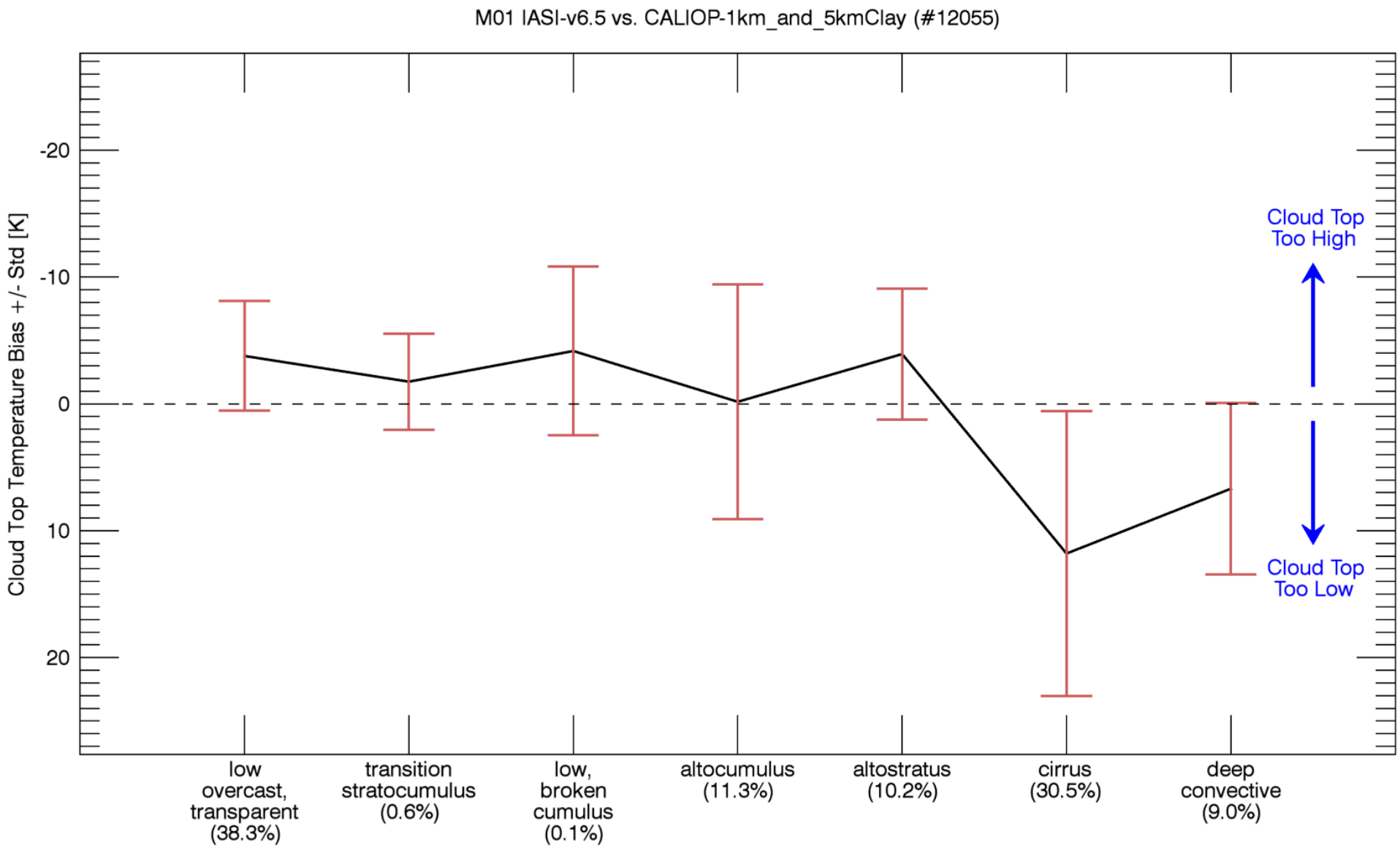




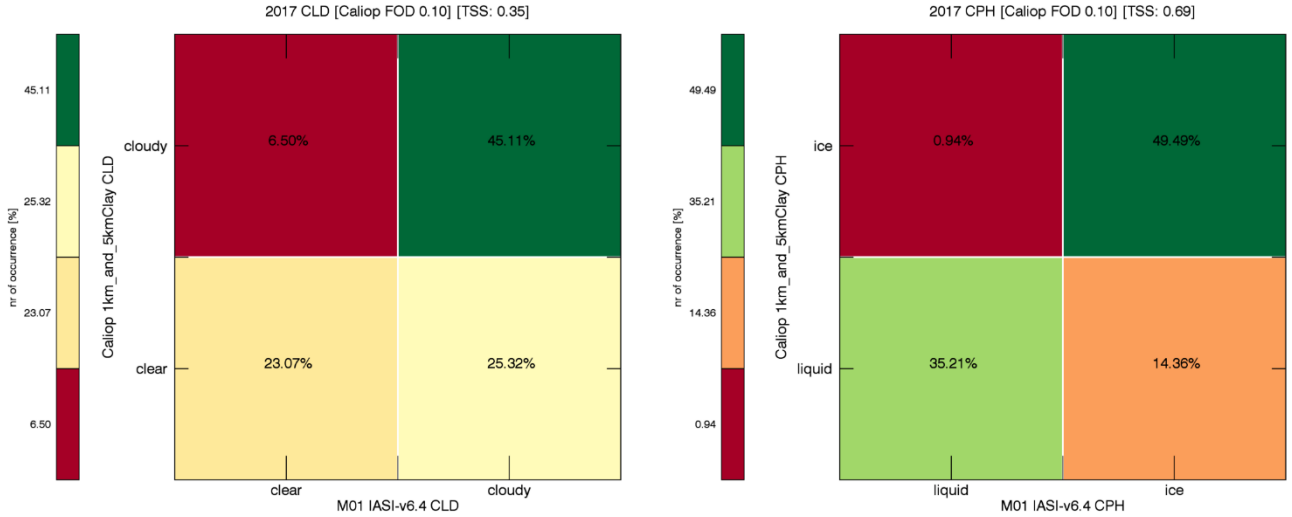


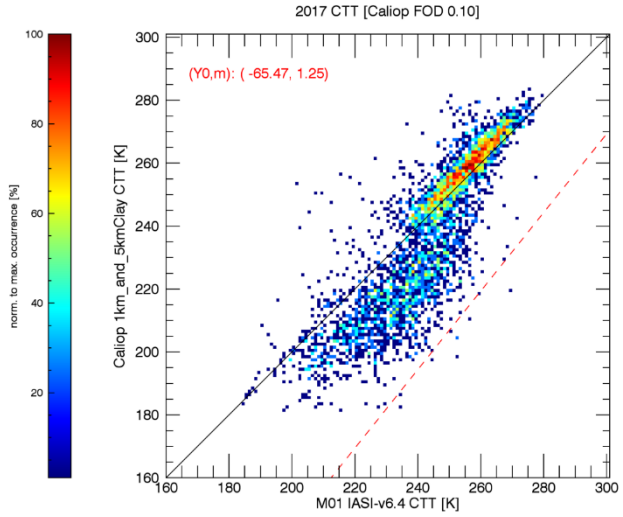


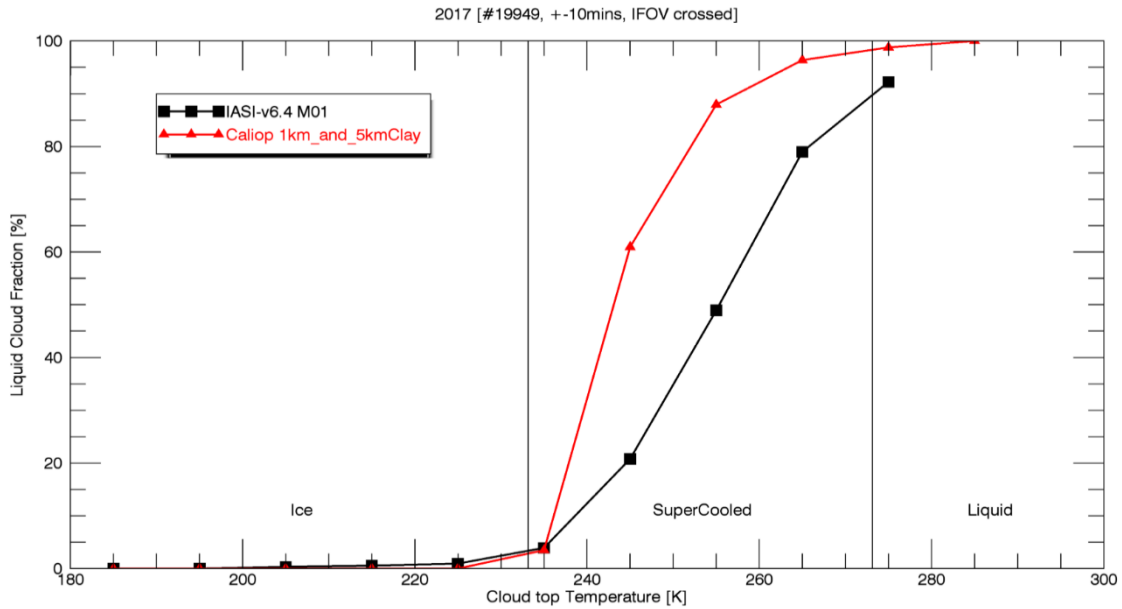
Example Cloud Top Temperature IASI vs. CALIOP 2017

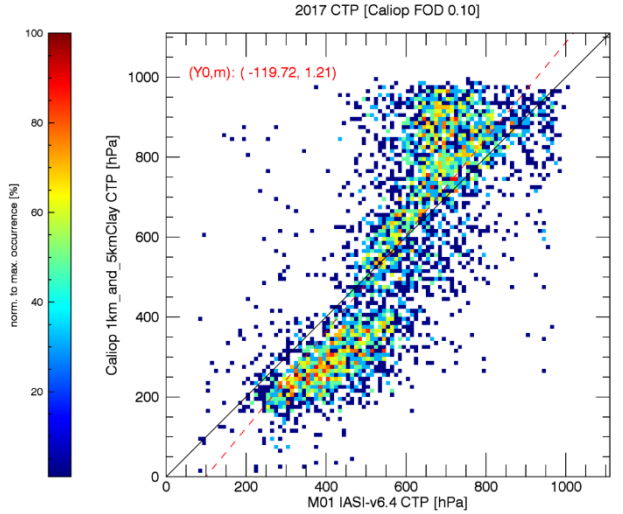


Example Plots for Metop-B IASI v6.4 vs CALIOP - 2017









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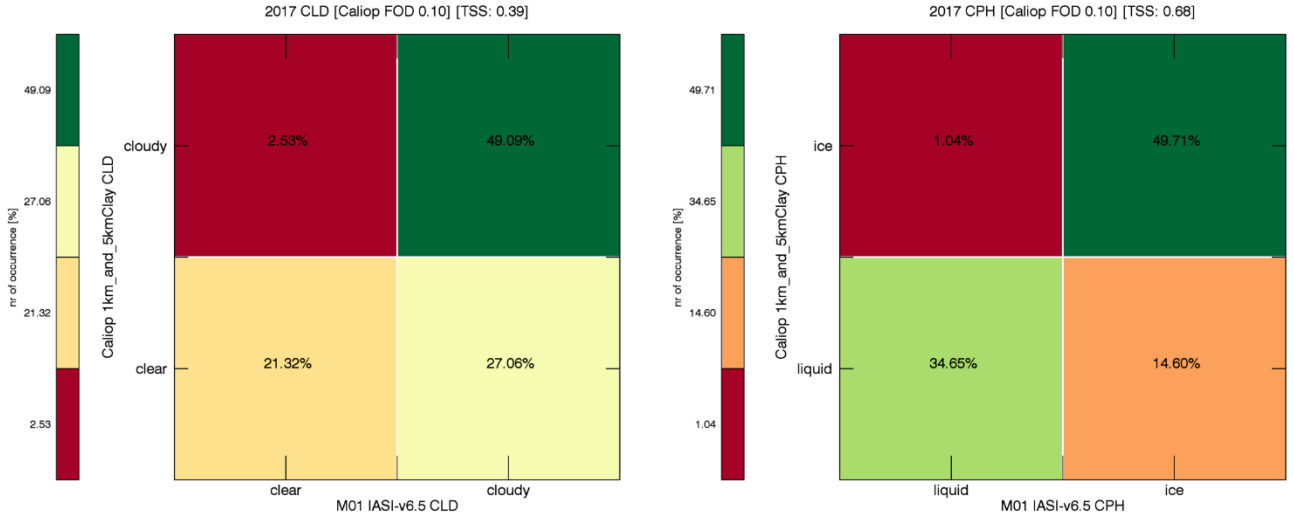
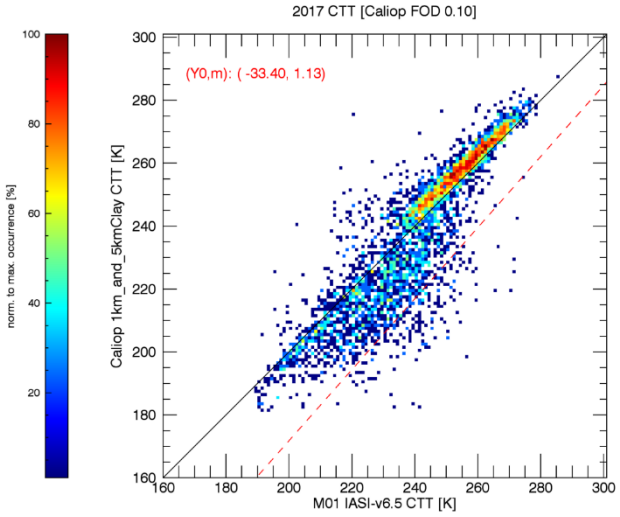
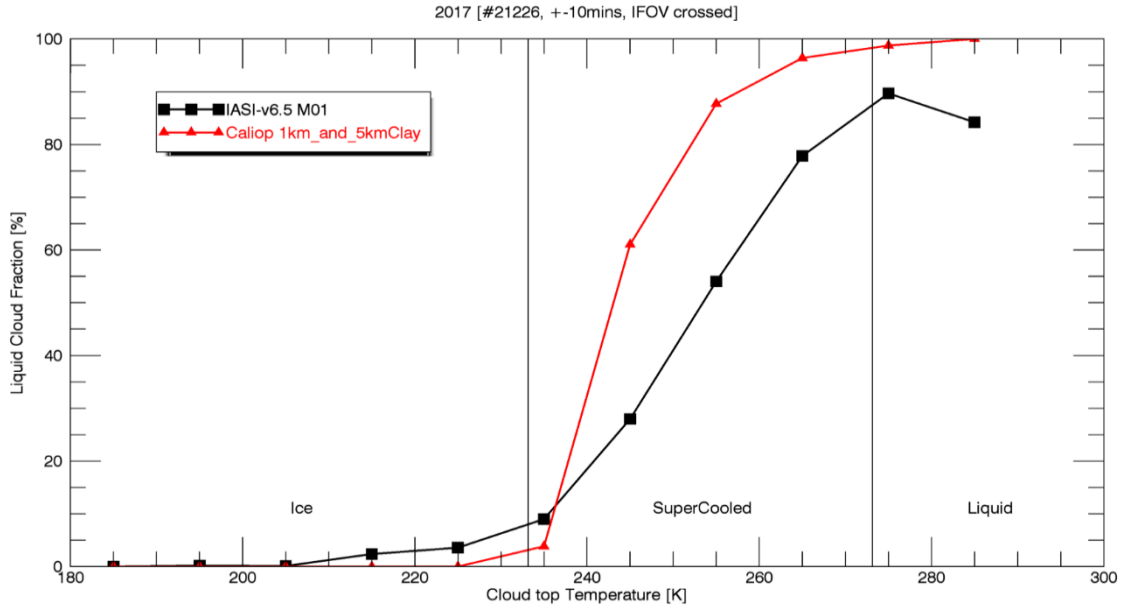
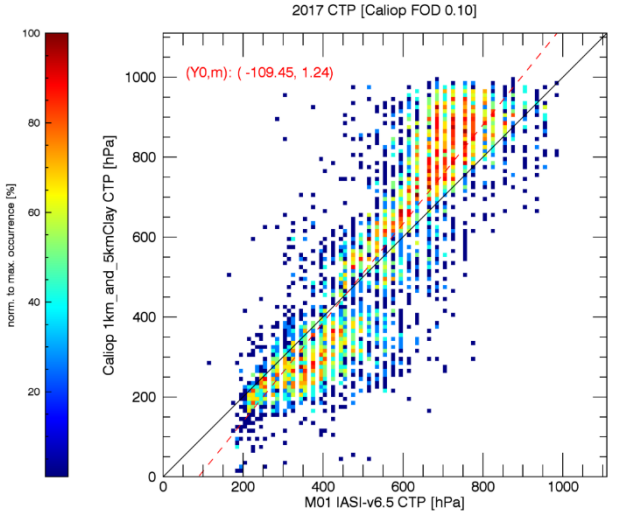
Example Plots for Metop-B IASI v6.5 vs CALIOP - 2017









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Summary

- EUMETSAT performs **continuous monitoring** of the operational products quality
  - to ensure accuracy of the products
  - meeting the user requirements and
  - monitor the stability.
- Ongoing work: extend capabilities and prepare for future missions (e.g. on EPS-SG, MTG).
  - reference data with characterised uncertainties needed
  - Satellite: CALIOP mission will be ending soon

    ? Follow-ups? E.g. AEOLUS, EARTH-CARE
  - Ground based / In-situ:

    ? Synop data for Cloud phase?

    ? Other ground based networks ?

    ? Dedicated campaigns ?

➔ Let me know!