

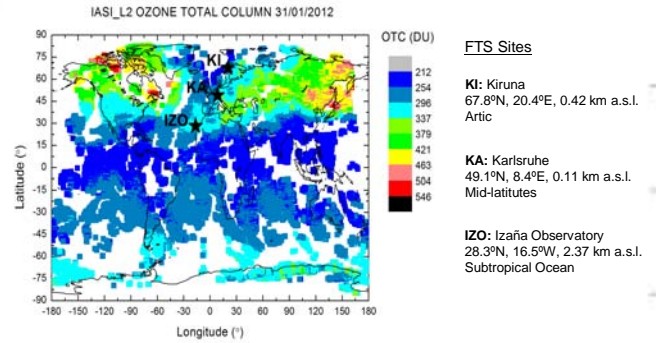
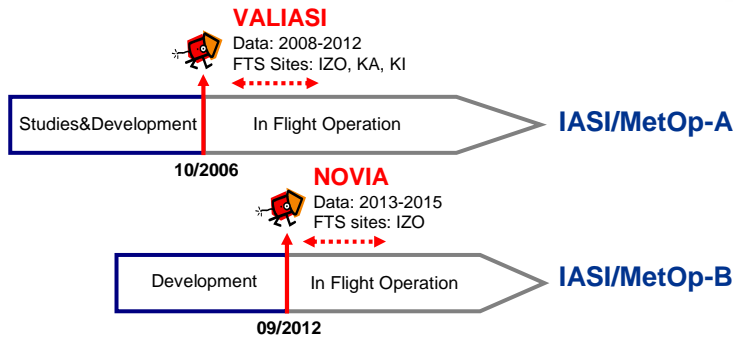
Validation of IASI Level 2 Atmospheric Trace Gas Products using ground-based Fourier Transform Spectrometers: Projects VALIASI and NOVIA



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The projects **VALIASI** (VALidation of IASI level 2 products, supported by EUMETSAT) and **NOVIA** (towards a Near Operational Validation of IASI level 2 trace gas products, supported by Spanish Government) will validate the IASI operational atmospheric trace gas products (Level 2): H₂O and O₃ profiles as well as total column amounts of H₂O, O₃, CH₄, N₂O, CO₂ and CO. For this purpose trace gas data measured by the ground-based FTS (Fourier Transform Spectrometer) technique are used as reference.



VALIDATION OF IASI OZONE TOTAL COLUMN (OTC) AT IZO: One example within VALIASI

IASI

- Operational L2 Ozone Total Column (IASI_L2) on MetOp-A [August et al., 2012] (v4: 2008-Sep 2010 and v5: onwards Sep 2010).
- OTC integrated from 1050 to 0.005 hPa, with a target uncertainty of 2.5%.

FTS

- FTS OTCs are retrieved with the algorithm PROFIT [Hase et al., 2004] from solar absorption spectra between 1000-1005 cm⁻¹. FTS detects four independent ozone partial columns (DOFS~4).
- OTC integrated from ~770 (2.37 km) to 0.005 hPa, with a theoretical precision of <1% [Schneider and Hase, 2008; García et al., 2012]. The ozone partial column between sea level and 2.37 km is 8±2 DU from Electro Chemical Cell sonde climatology (1999-2010) at Tenerife.

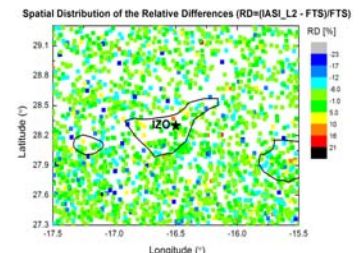
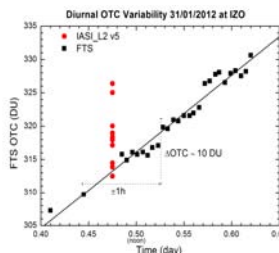
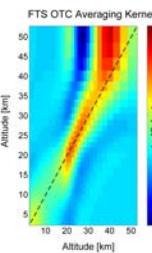
Validation Strategy

Temporal Criterion: ±1h

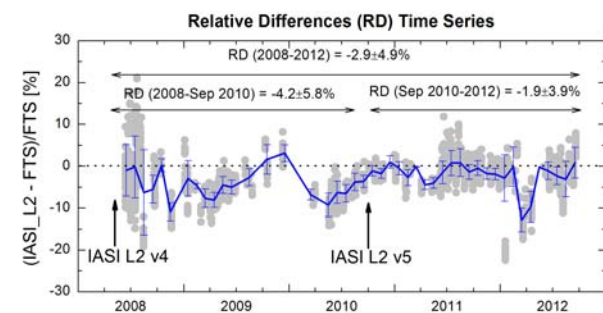
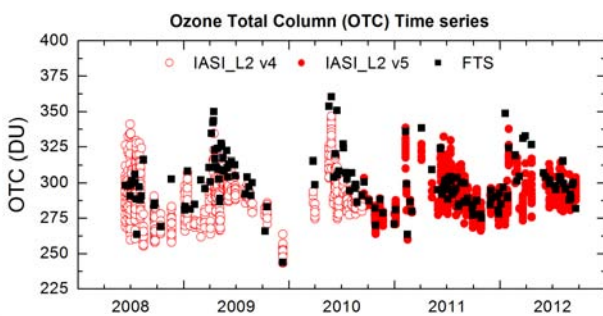
Spatial Criterion: ±1° around IZO

So restrictive due to occasionally significant diurnal OTC variations

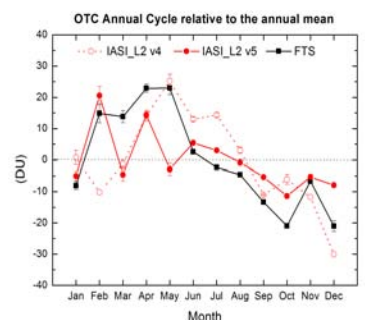
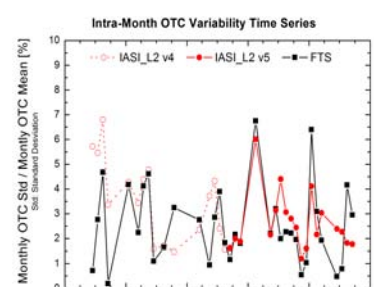
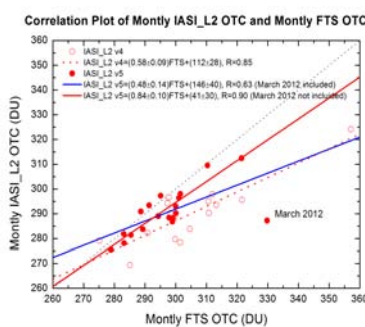
No significant influence of spatial coincidence criterion



Day-to-Day Intercomparison



Montly Intercomparison



- FTS is a powerful tool to validate IASI L2 products: high precision, high measurement frequency and good vertical resolution.

- For OTC IASI-FTS intercomparison:

- 1) Significant improvement for IASI_L2 OTC v5: IASI underestimates by about 2±4% the FTS OTC.
- 2) Good consistency of the OTC annual cycle and the intra-month OTC variability (largest discrepancies in spring): IASI_L2 misses ozone tropospheric contribution.

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