

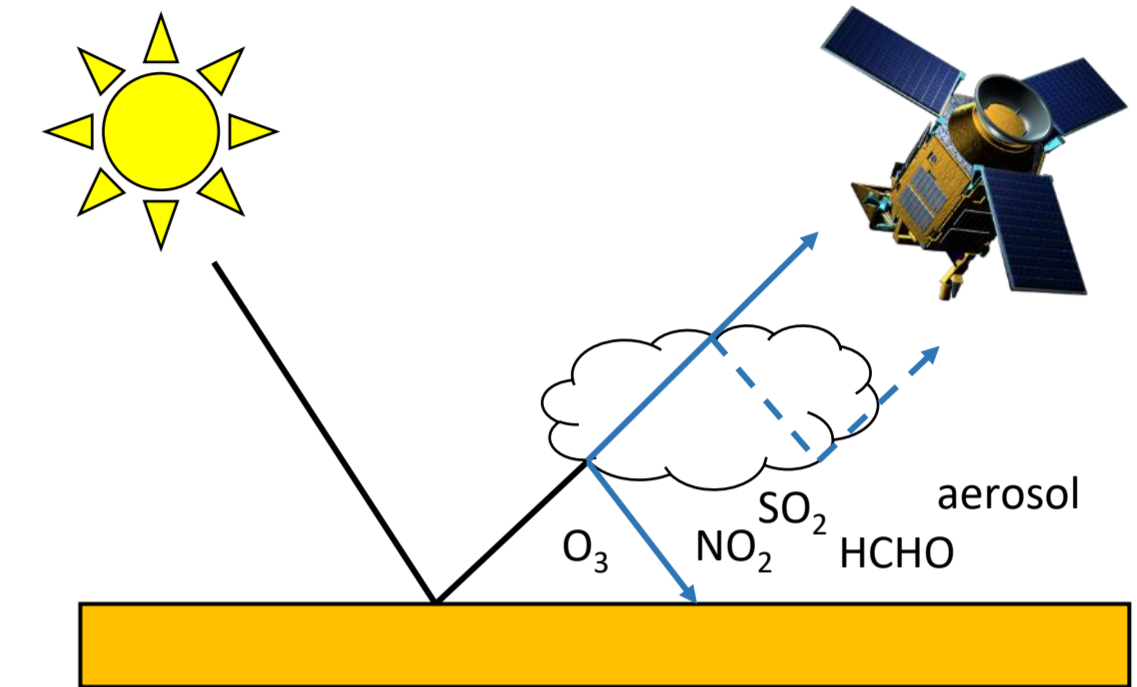
Sentinel-5p TROPOMI Cloud Products: Quality Assessment Using Ground-based and Satellite Data, Evolution of Data Quality, and Impact on Trace Gas Retrievals

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Motivation: quality of trace gas retrievals depends on quality of same-sounder cloud products

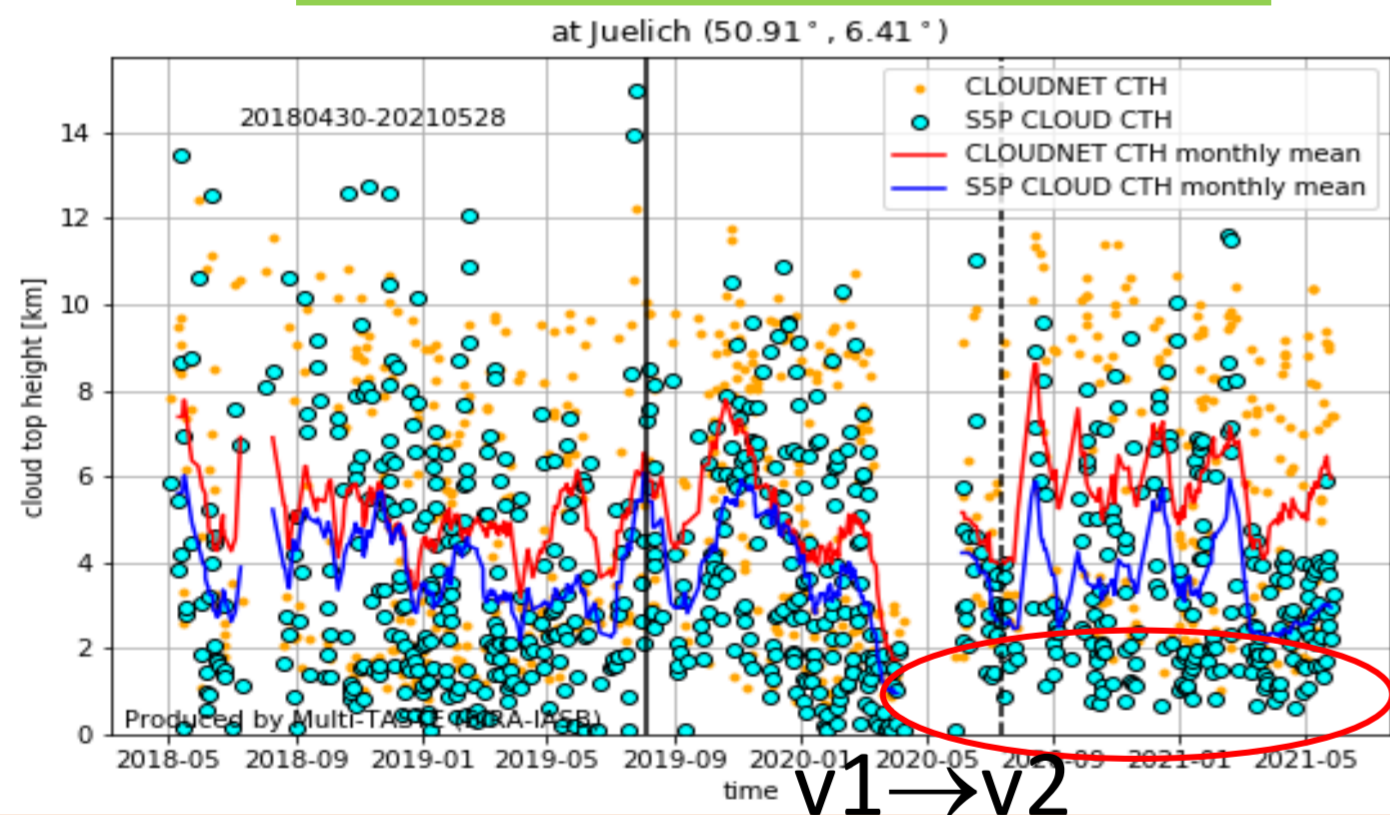
Cloud products assessed:

S5P OCRA/ROCINN_CAL (layer model), S5P OCRA/ROCINN_CRB (Lambertian), S5P FRESCO (Lambertian)



Quality of TROPOMI cloud products and quality evolution is monitored using ground-based CLOUDNET and satellite data

S5P ROCINN_CAL vs CLOUDNET cloud top height



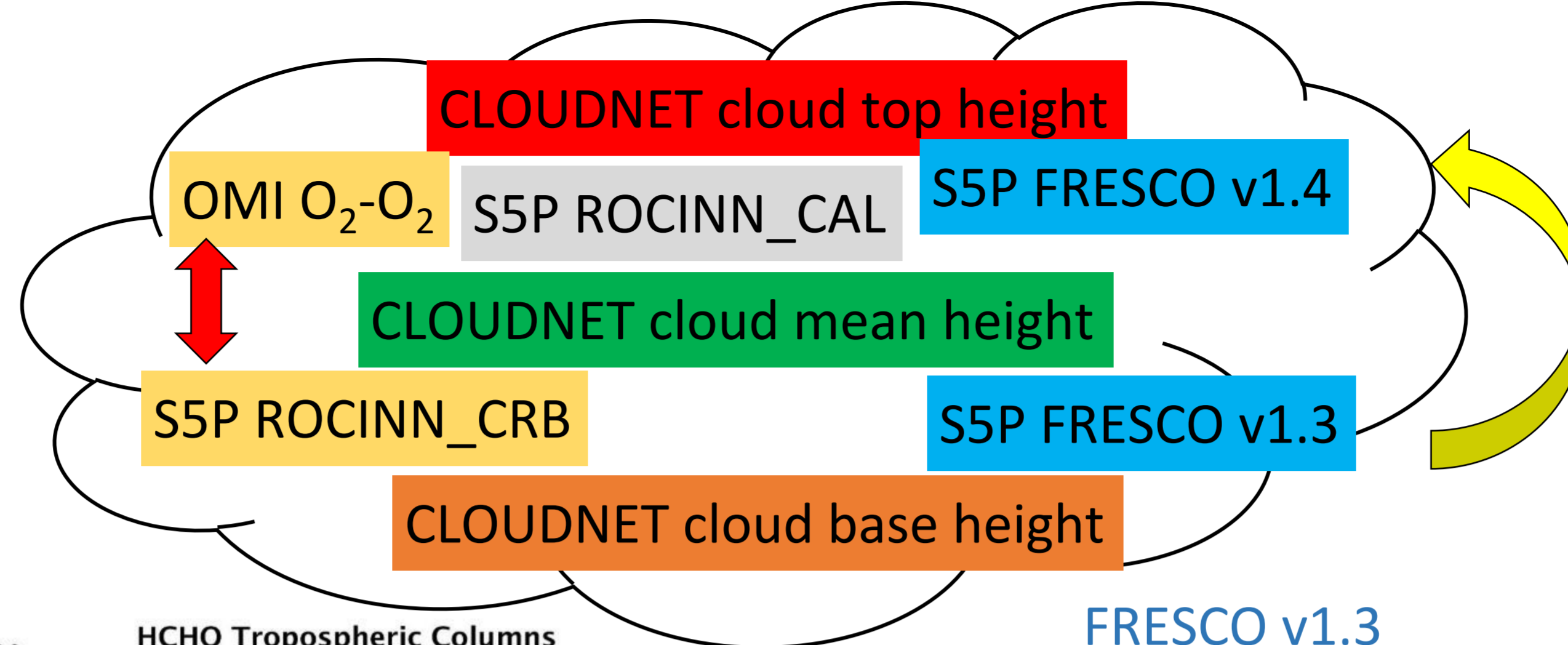
Conclusions:

- Tropospheric NO₂ and HCHO retrievals sensitive to cloud algorithm
- ROCINN_CRB v1 → v2.1. Cloud height decrease of high clouds. No large impact on HCHO retrieval
- FRESCO v1.3 → v1.4. Cloud height increase of low clouds. Large impact on NO₂ retrieval
- OMI HCHO and S5P HCHO: cloud algorithm main cause of difference

Latest results @ S5P-TROPOMI Validation Data Analysis Facility: <https://mpc-vdaf.tropomi.eu/index.php/clouds>

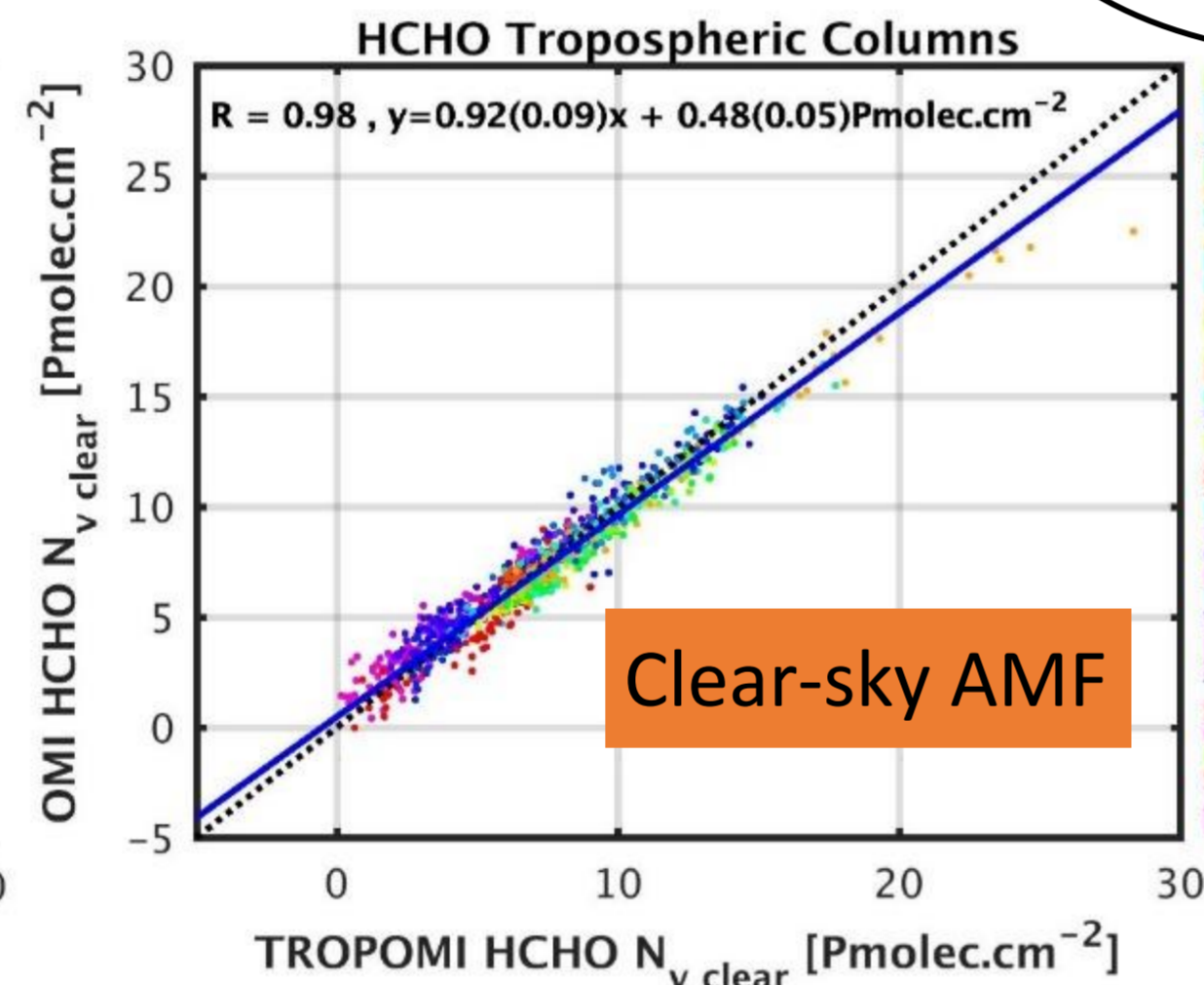
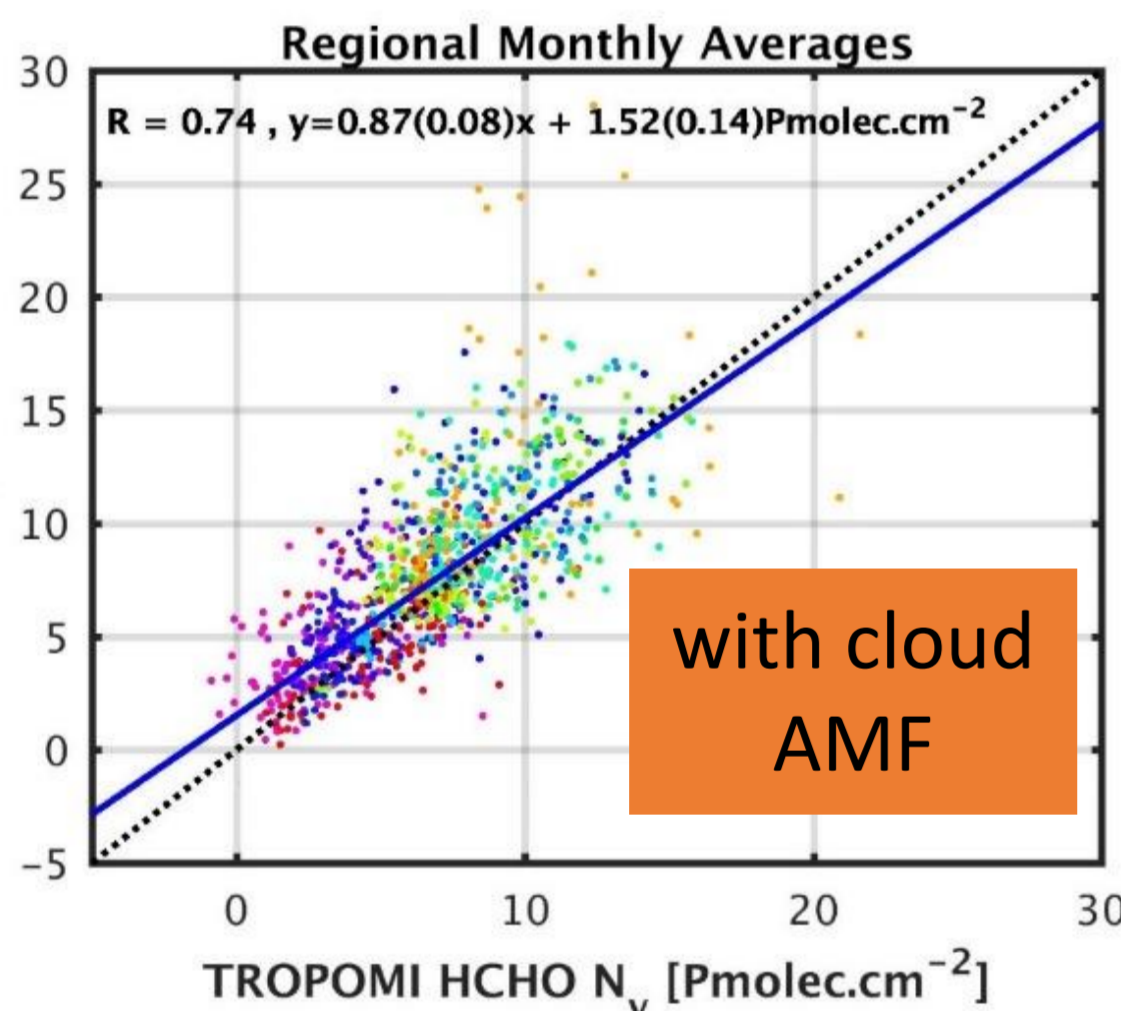
Refereed papers: Compernelle et al., 2021 (<https://doi.org/10.5194/amt-14-2451-2021>), De Smedt et al., 2021 (<https://doi.org/10.5194/acp-21-12561-2021>)

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S5P HCHO

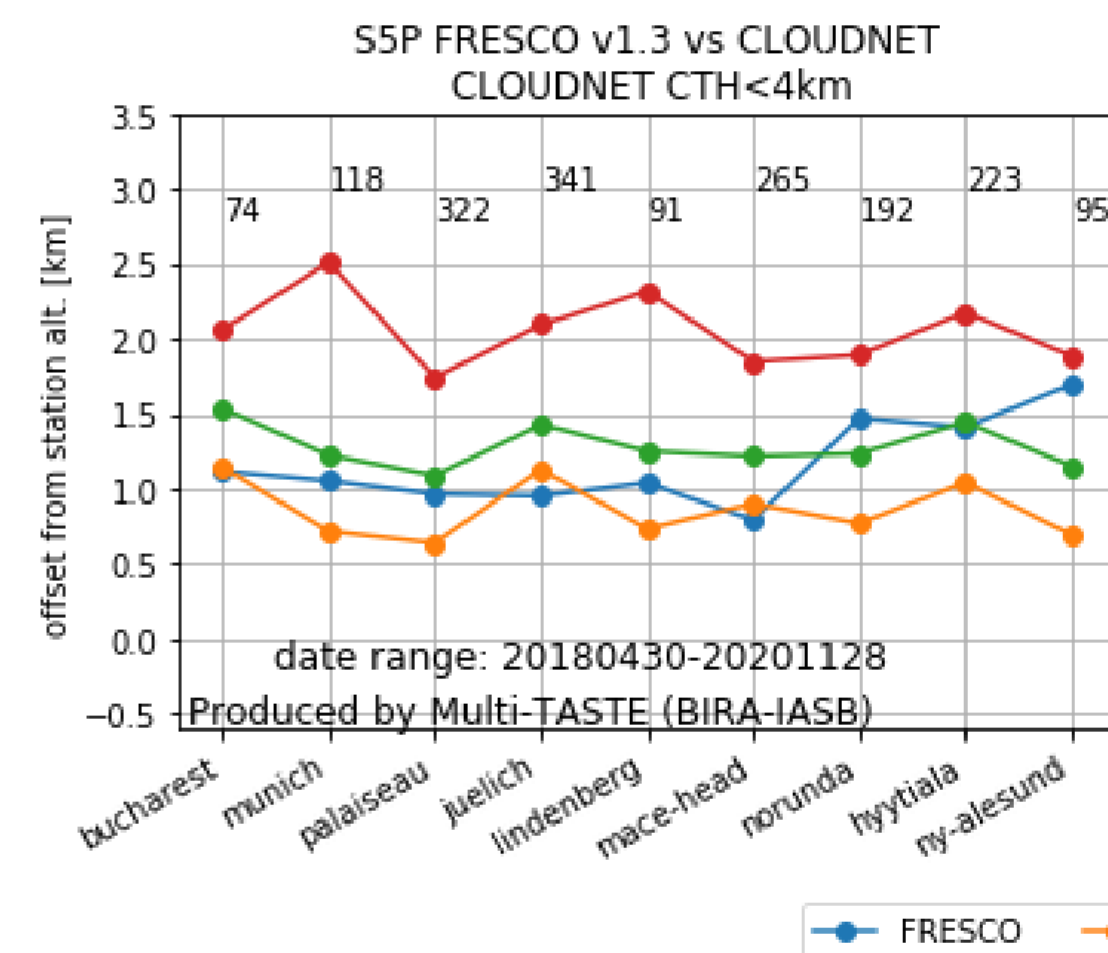
S5P NO₂



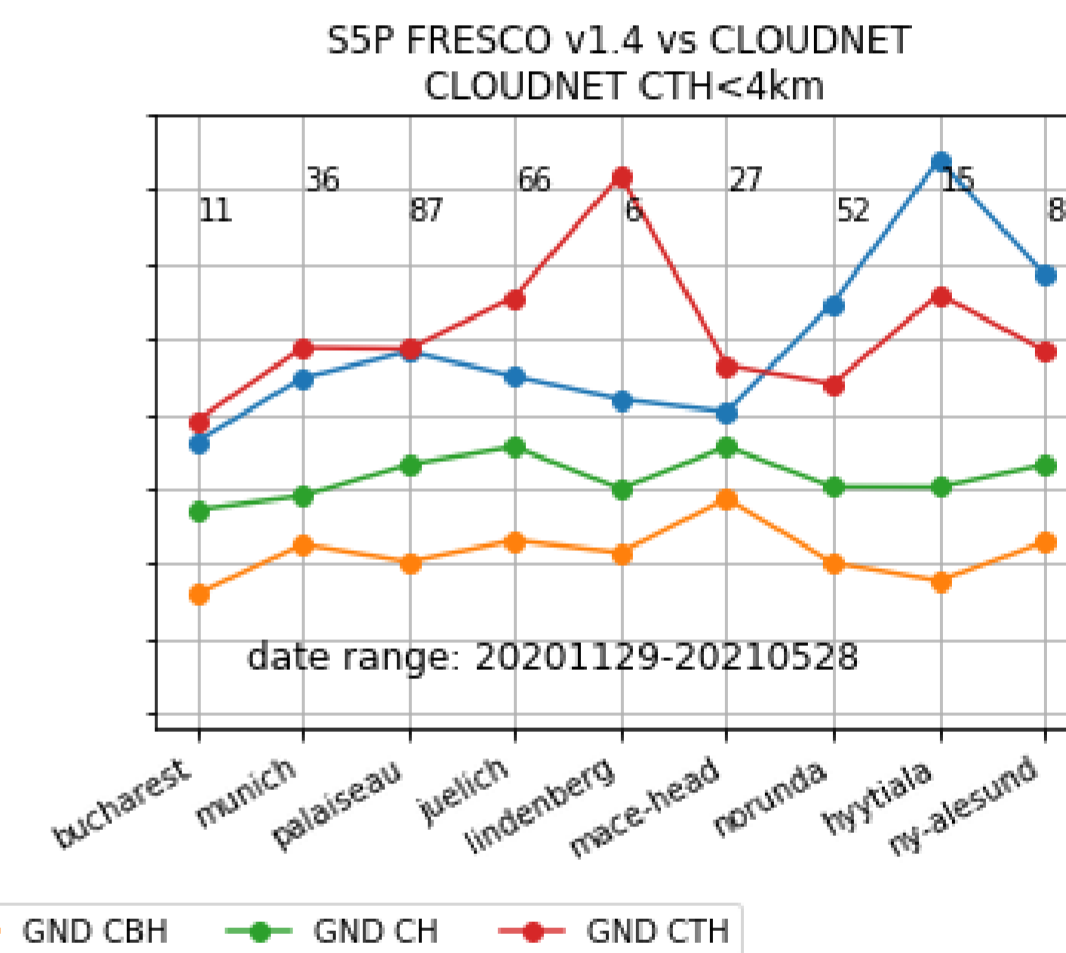
De Smedt et al. ACP 2021 [10.5194/acp-21-12561-2021](https://doi.org/10.5194/acp-21-12561-2021)

S5P HCHO ← ROCINN_CRB cloud
OMI HCHO ← O₂-O₂ cloud
 Use of different cloud products causes
 discrepancy between OMI and S5P HCHO

FRESCO v1.3



FRESCO v1.4



S5P NO₂ ← FRESCO-S 1.4 clouds

- higher NO₂ trop VCD
- lower bias wrt reference data
- See poster Verhoelst, P1.5.5