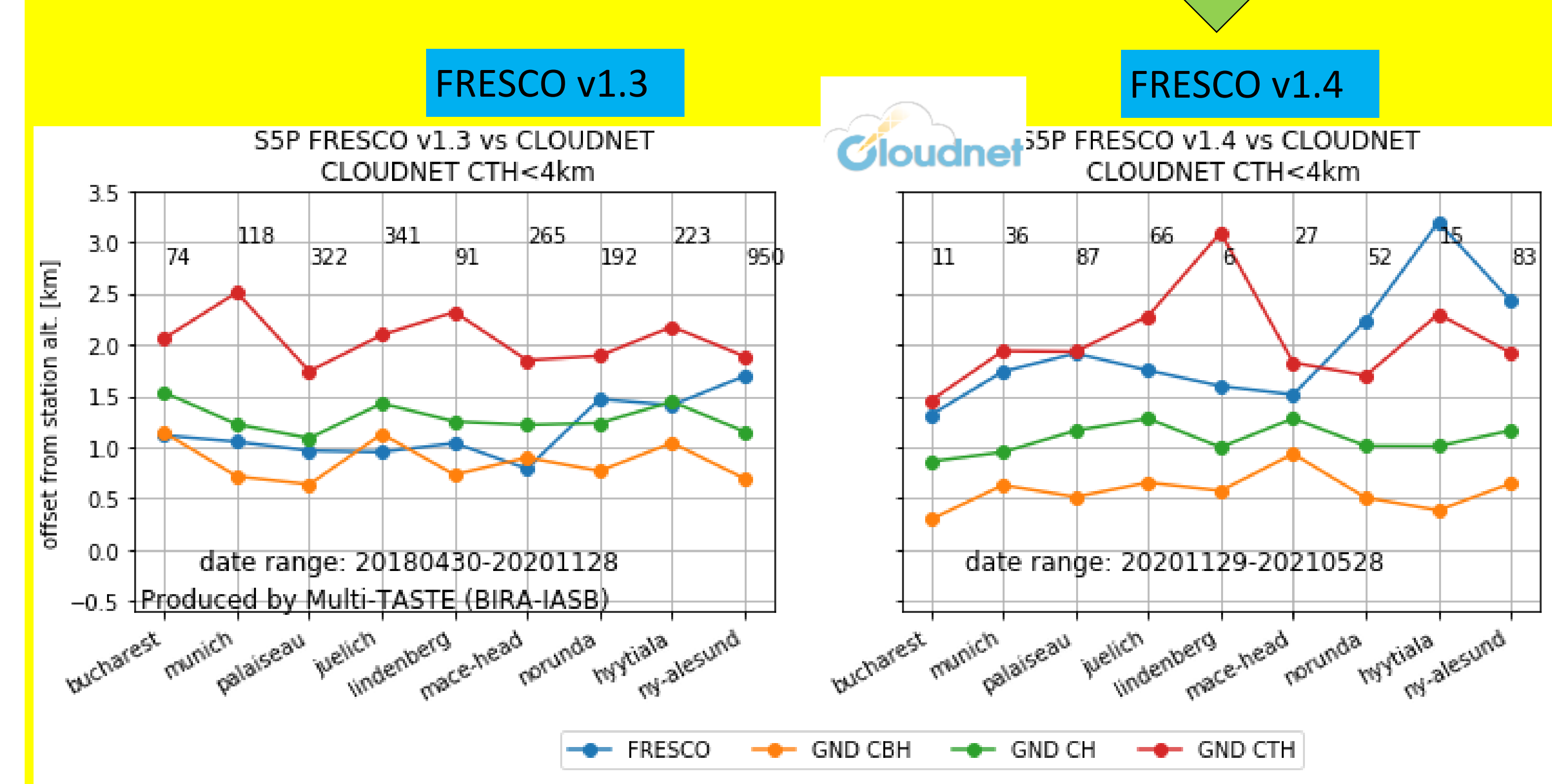
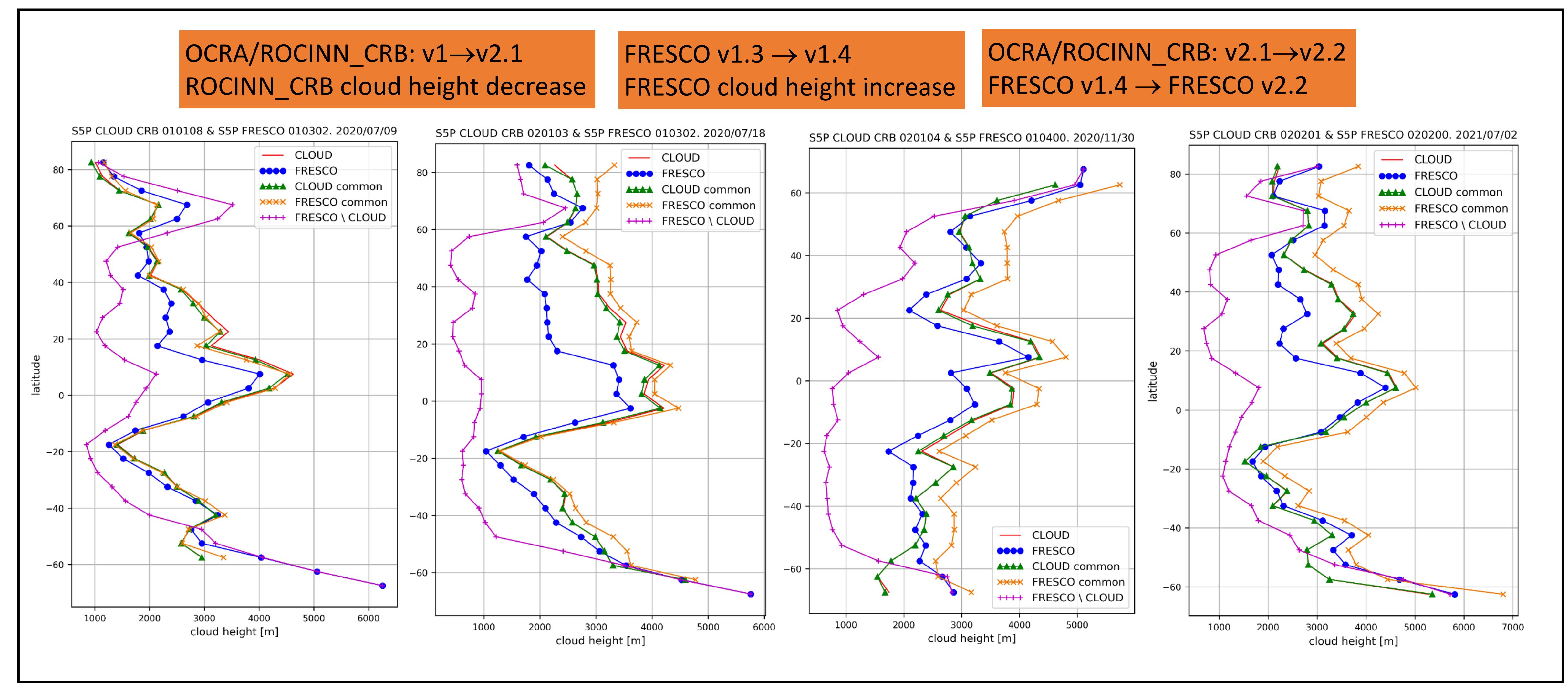
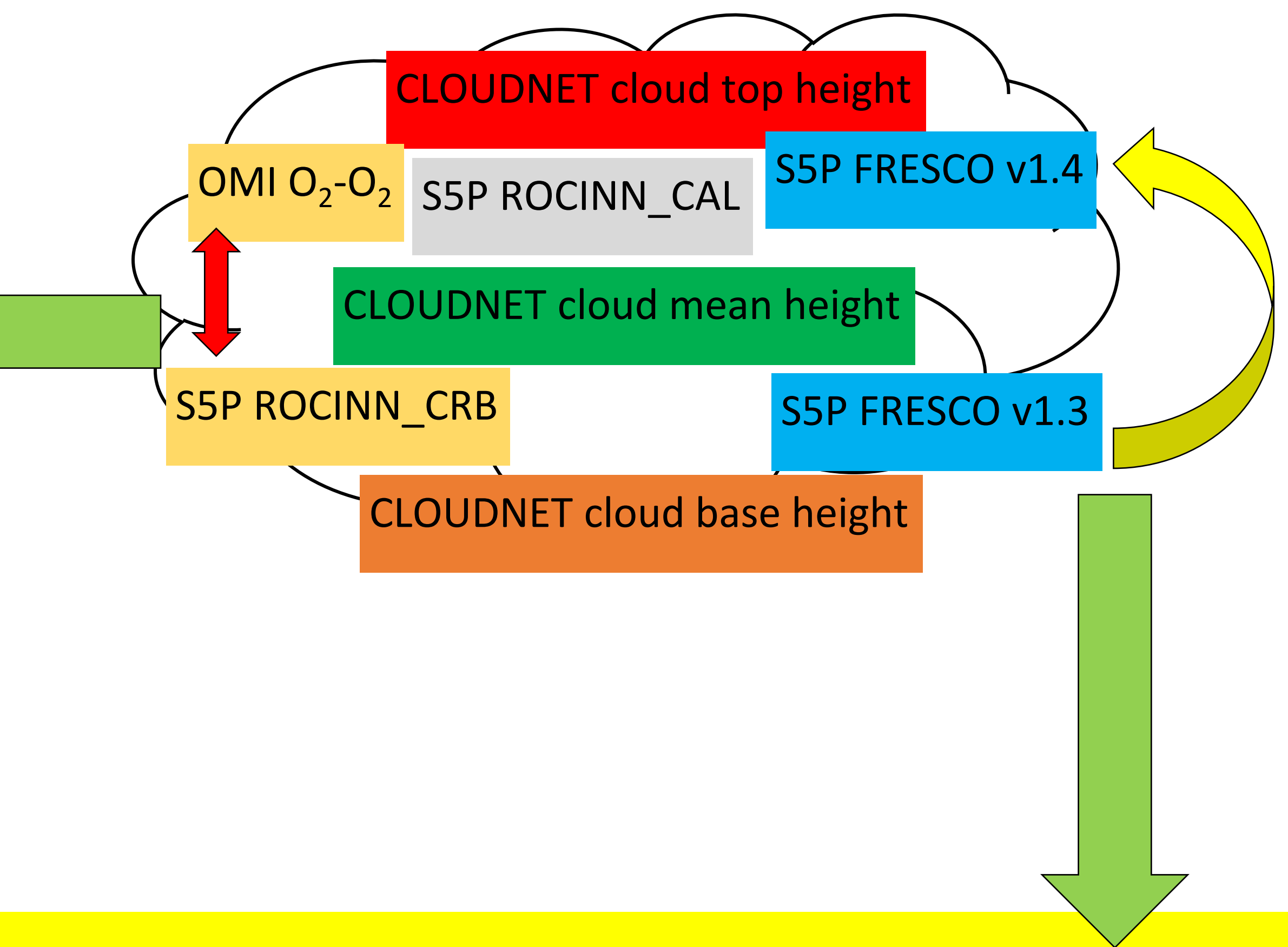
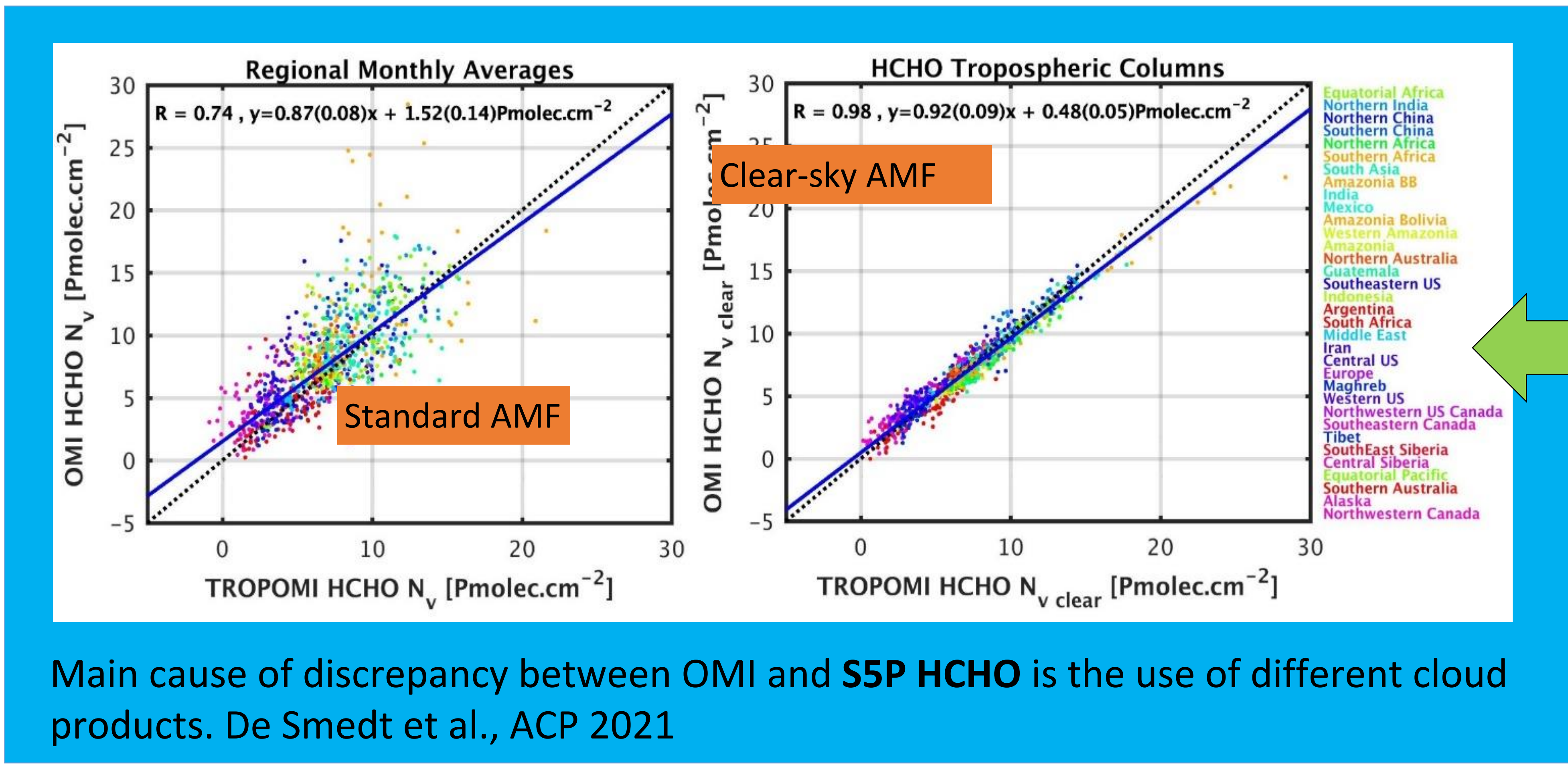
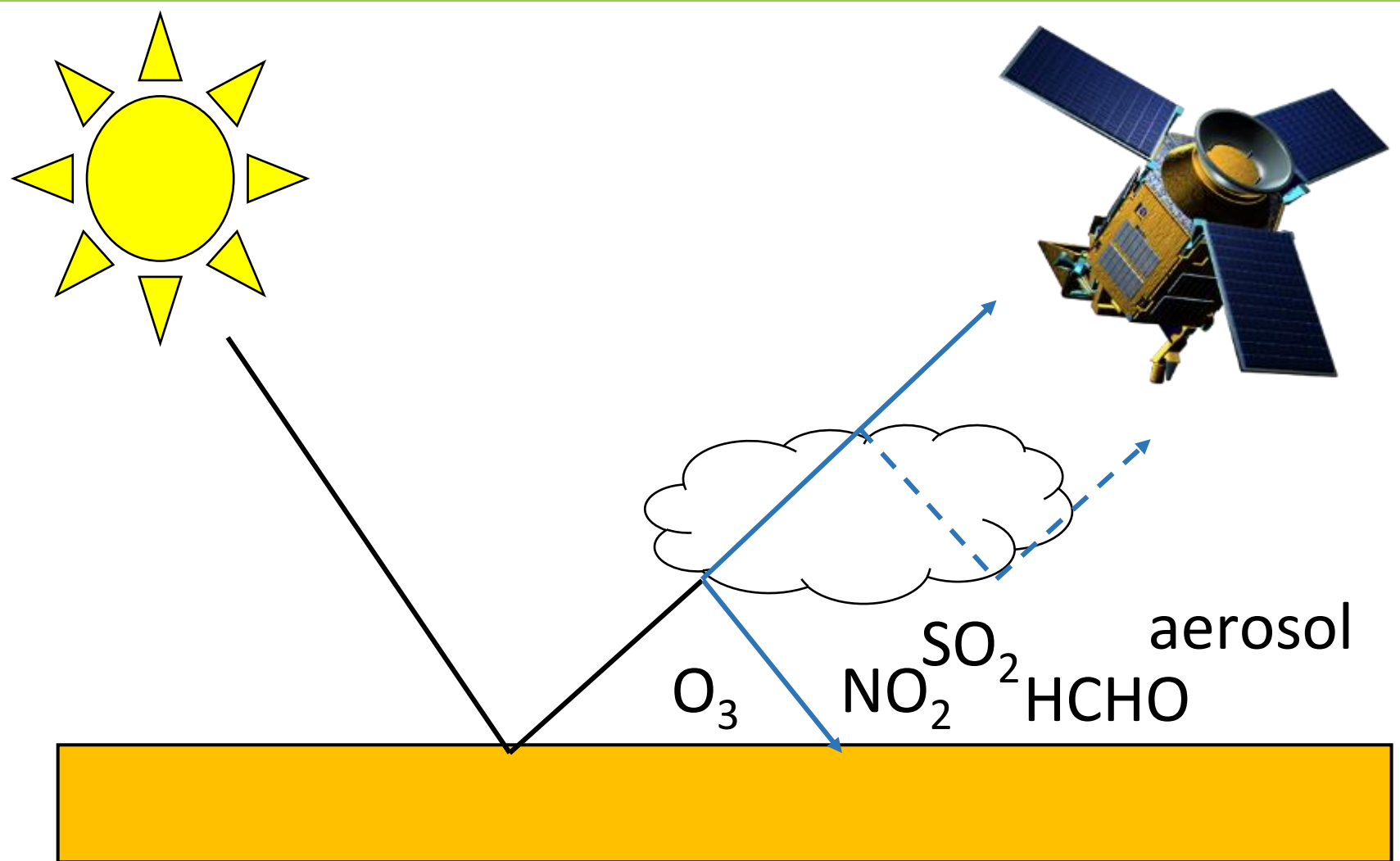




# Sentinel-5p TROPOMI Cloud Products: Quality Assessment Using Ground-based and Satellite Data, Evolution of Data Quality, and Impact on Trace Gas Retrievals

Steven Compernelle<sup>1</sup>, A. Argyrouli<sup>2,3</sup>, R. Lutz<sup>3</sup>, M. Sneep<sup>4</sup>, J.-C. Lambert<sup>1</sup>, I. De Smedt<sup>1</sup>, H. Eskes<sup>4</sup>, A.M. Fjaeraa<sup>5</sup>, D. Hubert<sup>1</sup>, A. Keppens<sup>1</sup>, B. Langerock<sup>1</sup>, D. Loyola<sup>3</sup>, V.M. Garcia<sup>3</sup>, E. O'Connor<sup>6,7</sup>, G. Pinardi<sup>1</sup>, F. Romahn<sup>3</sup>, P. Stammes<sup>4</sup>, J. van Geffen<sup>4</sup>, T. Verhoelst<sup>1</sup>, C. Vigouroux<sup>1</sup>, P. Wang<sup>4</sup>, H. Yu<sup>1</sup>  
 (1) BIRA-IASB, Belgium (2) TUM, Germany (3) DLR, Germany (4) KNMI, The Netherlands (5) NILU, Norway (6) FMI, Finland (7) Reading, UK

**Motivation:** quality of trace gas retrievals depends on quality cloud products: both need to be assessed  
**Cloud products assessed:**  
 S5P OCRA/ROCINN\_CAL (layer model)  
 S5P OCRA/ROCINN\_CRB (Lambertian)  
 S5P FRESCO (Lambertian)



**FRESCO v1.3 → v1.4:**

- Increase of FRESCO cloud height → increase of S5P NO<sub>2</sub> trop VCD
- Lower bias wrt reference data
- See poster T. Verhoelst, P1.5.5

**Conclusions:**

- Tropospheric NO<sub>2</sub> 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 NO<sub>2</sub> 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>)  
 Acknowledgments: We thank ESA (S5P MPC) & BELSPO (ProDex TROVA-2) for funding and Instrument PIs and staff at Cloudnet & ARM stations and ACTRIS RI & ACTRIS-2 for funding of Cloudnet data.