

Supplementary Material

MS NO.: egusphere-2025-5578

S1 Comparisons against GRUAN

S1.1 Influence of clouds

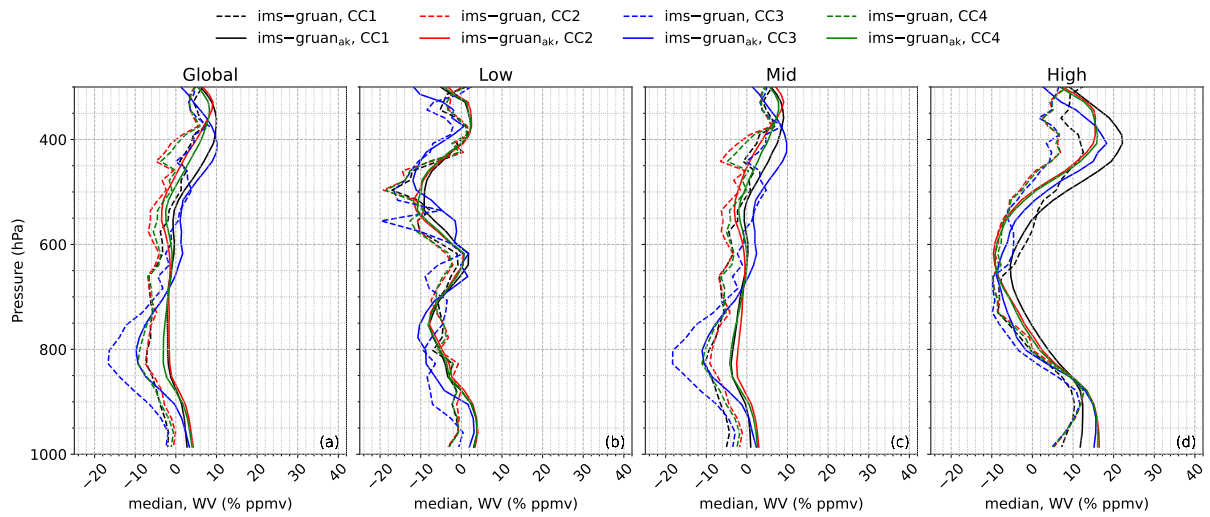


Fig. S1: Median differences of RAL IMS to GRUAN WV profiles in (a) global, (b) low-, (c) mid- and (d) high-latitude statistics. Dashed lines represent statistics assuming original GRUAN profiles, and solid lines assume their AK-smoothed profiles as the reference. Black curves represent the statistics assuming the baseline cloud criterion (CC1), red curves are related to CC2, blue to CC3, and green to CC4.

Table S1: Number of profiles part of the statistics assuming GRUAN as the reference. Numbers correspond to the largest number of points available at a given level, since they vary for different reasons – especially in the lower troposphere.

	Global	Low	Mid	High
IMS-GRUAN, CC1	89593	1828	73700	14065
IMS-GRUAN, CC2	41100	1375	34945	4780
IMS-GRUAN, CC3	13969	251	12692	1026
IMS-GRUAN, CC4	53128	1577	45836	5715

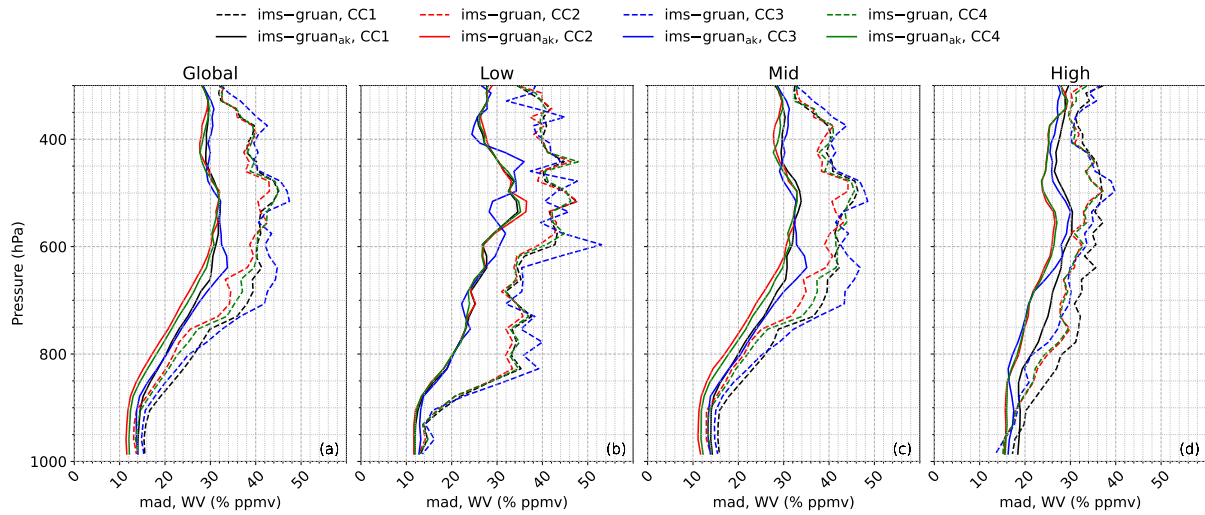


Fig. S2: Median absolute deviation (MAD) differences of RAL IMS to GRUAN WV profiles in (a) global, (b) low-, (c) mid- and (d) high-latitude statistics. Dashed lines represent statistics assuming original GRUAN profiles, and solid lines assume their AK-smoothed profiles as the reference. Black curves represent the statistics assuming the baseline cloud criterion (CC1), red curves are related to CC2, blue to CC3, and green to CC4.

S2 CSV files

Files in comma-separated values (CSV) format are provided for every figure in the main document. Their content include statistics (median or MAD) in ppmv for the differences of RAL IMS and GRAS-RO to a given reference (ERA-I analysis or GRUAN) as a function of pressure levels – from 1000 to 300 hPa. Further, they contain the reference median, which allows to compute the relative values depicted in figures, and the number of points available in different pressure levels. The set of CSV files provided as supplementary material is listed below:

- fig3_ro_ims_300km_median_ppmv_06-2007_12-2016_ref-era_v8-7.csv
- fig4_ro_ims_300km_cloud_median_ppmv_06-2007_12-2016_ref-era_v8-7.csv
- fig5_ro_ims_300km_ak_cloud4_land-ocean_median_ppmv_06-2007_12-2016_ref-era_v8-7.csv
- fig6_ro_ims_gruan_300km_cloud1_median_ppmv_06-2007_12-2016_ref-gruan_v9-7.csv
- fig7_ro_ims_gruan_300km_cloud1_mad_ppmv_06-2007_12-2016_ref-gruan_v9-7.csv
- fig8_ro_ims_gruan_300km_ak_median_day-night_cloud1_ppmv_06-2007_12-2016_ref-gruan_v9-7.csv
- fig9_ro_ims_gruan_300km_ak_mad_day-night_cloud1_ppmv_06-2007_12-2016_ref-gruan_v9-7.csv
- s1_ro_ims_gruan_300km_cloud_median_ppmv_06-2007_12-2016_ref-gruan_v9-7.csv
- s2_ro_ims_gruan_300km_cloud_mad_ppmv_06-2007_12-2016_ref-gruan_v9-7.csv