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On the use of Mobile-DOAS measurements for air quality satellite validation

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The TROPOMI/S5p instrument was launched in October 2017, aiming to measure from space the atmospheric composition for air quality and ozone monitoring. Since 30 April 2018, TROPOMI/S5p routinely delivers NO₂ tropospheric VCDs in quasi-real-time. The first comparisons between this operational TROPOMI product and measurements from the ground and aircraft generally show good correlations but also a negative bias over polluted areas. Such a bias is expected from the low spatial resolution of the CTM used in the operational TROPOMI retrieval and several studies reported a better agreement with local measurements of NO₂ VCDs when using a higher resolution model for the satellite AMFs, in practice, changing the original TM5-MP for the CAMS Ensemble. We compare mobile-DOAS measurements with the two aforementioned versions of the TROPOMI retrievals (TM5-MP and CAMS). Our Mobile-DOAS measurements were performed with the BIRA-IASB Mobile-DOAS during 19 clear sky days. We sampled polluted and clean areas during TROPOMI overpasses in Belgium and Germany between June 2018 and September 2020. Beside studying the effect of the CTM model on the comparisons, we investigate the general added-values of such mobile-DOAS measurements for the validation of TROPOMI/S5p and forthcoming missions.