Comparison of TROPOMI/Sentinel 5 Precursor NO_2 observations with ground-based measurements in Helsinki: first results

Iolanda Ialongo[1], Henrik Virta[1], Jari Hovila[1], Henk Eskes[2], and John Douros[2]

[1]Space and Earth Observation Centre, Finnish Meteorological Institute, Helsinki, Finland.
[2]Royal Netherlands Meteorological Institute, De Bilt, Netherlands.

Correspondence to: I. Ialongo (iolanda.ialongo@fmi.fi)

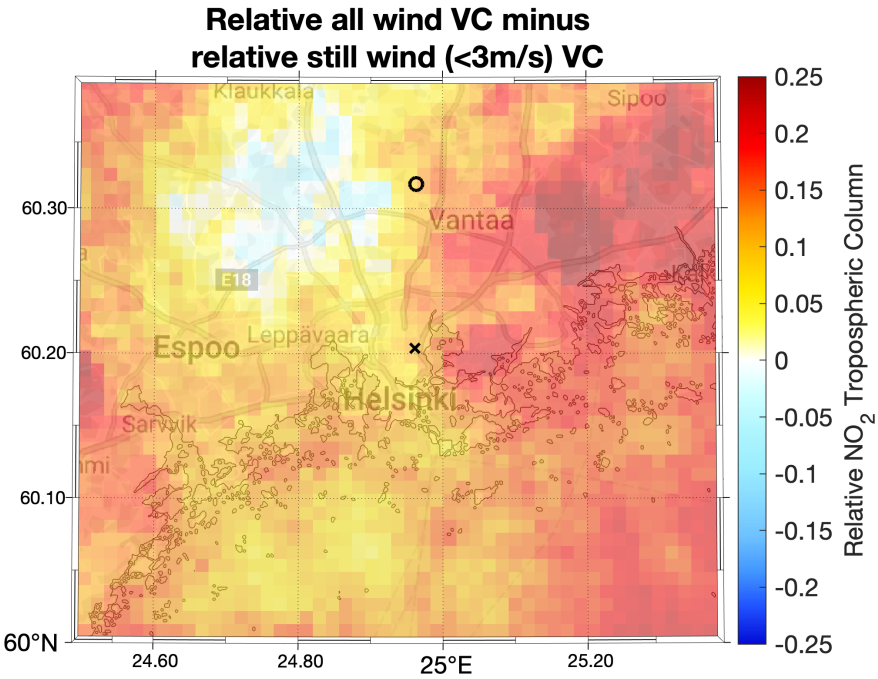

Figure S1. Difference between the relative NO_2 tropospheric columns for all wind conditions and those with a wind speed less than $3\,\mathrm{m\,s^{-1}}$ ("still" winds). The map has been created by projecting spherical Earth coordinates (latitude/longitude) onto a $1\,\mathrm{km} \times 1\,\mathrm{km}$ resolution grid using the transverse Mercator map projection centred at Helsinki. Tropospheric TROPOMI NO_2 retrievals (pixels) during the period 15.4.–30.9.2018 falling to either wind scenario have been binned and averaged to their respective map grids, and then normalised to the corresponding maximum values within each grid. Finally, the resulting normalized maps have been subtracted from one another to create the final map (all winds minus still winds). The wind speed correponding to each TROPOMI pixel was estimated by interpolating ECMWF ERA5 wind data on the 1000, 975, 950, and $925\,\mathrm{hPa}$ pressure levels to the pixel's overpass time and the coordinates of its corners and centre, and averaging the results. Only TROPOMI data with a QA value >0.75 were considered.

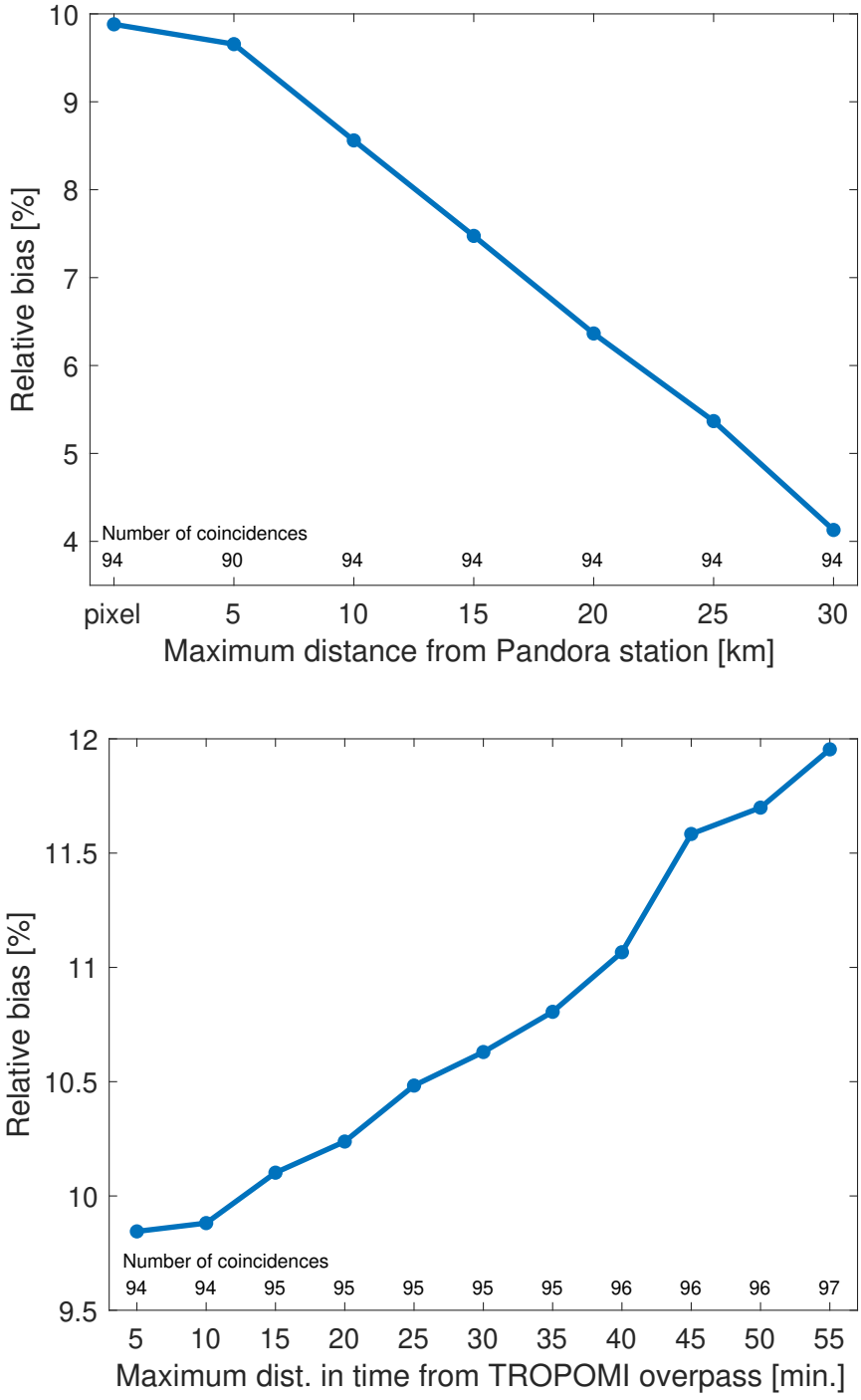

Figure S2. Mean relative difference between TROPOMI and Pandora total columns as a function of the maximum distance between the centre of the pixel and the ground-based station (upper panel) and as a function of the maximum time difference from the TROPOMI overpass (lower panel). The number of coincidences for different collocation criteria are shown above the x-axis.

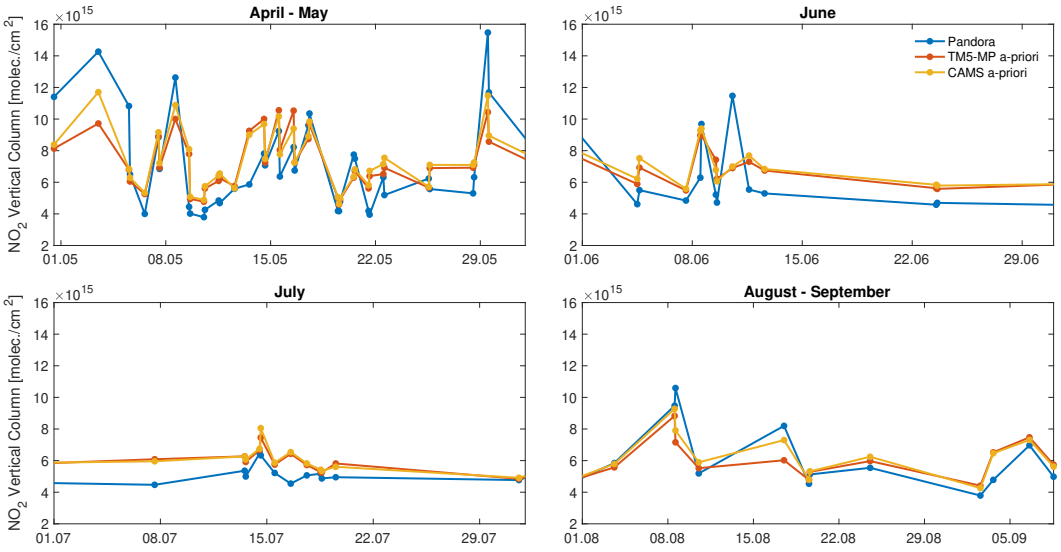

Figure S3. Time series of co-located TROPOMI summed columns derived using CAMS regional ENSEMBLE (yellow line) and TM5-MP (red line) a-priori NO_2 profiles, and Pandora (blue line) total columns during 30.4.–30.9.2018.