Geophysical Research Abstracts
Vol. 19, EGU2017-10311-1, 2017
EGU General Assembly 2017

Accuracy of Ground-based measurements in polar vortex conditions: Comparison to TOMS/OMI observations during 1979-2013

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We estimate the bias and drifts of ground-based total column ozone (TCO) measurements for 11 stations in Antarctica, with the observations carried out in winter/spring conditions inside the polar vortex during 1979-2013 period. This is the first comparison exercise in the polar vortex conditions. The ground-based measurements (GBM) from Dobson, Brewer, SAOZ and DOAS spectrometers were used for the analysis. In general, the GBMs show good agreement with satellite measurements at all stations for each instrument where correlation is higher than 0.94. Although bias between GBM and satellite measurements are generally station dependent, SAOZ shows relatively large and Dobson shows relatively small bias. There is no specific pattern in drifts and are within $\pm$0.09% at all stations with Dobson showing the least and DOAS exhibiting the highest drift. The relative difference (RD) between Satellite and ground based measurements show dependence on satellite solar zenith angle (SZA) (except Dobson) and temperature (except Dobson and SAOZ) and thus also contributing to the bias in the measurements.