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OCIO as continuously observed by TROPOMI on Sentinel 5P

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Chlorine dioxide (OCIO) is a by-product of the ozone depleting halogen chemistry in the stratosphere. Although being rapidly photolysed at low solar zenith angles (SZAs) it plays an important role as an indicator of the chlorine activation in polar regions during polar winter and spring at twilight conditions because of the nearly linear dependence of its formation on chlorine oxide (ClO).

The Tropospheric Monitoring Instrument (TROPOMI) is an UV-VIS-NIR-SWIR instrument on board the Sentinel-5P satellite developed for monitoring the composition of the Earth's atmosphere. It was launched on 13 October 2017 in a near polar orbit. It measures spectrally resolved earthshine radiances at an unprecedented spatial resolution of around $3.5 \times 7.2 \text{ km}^2$ ($3.5 \times 5.6 \text{ km}^2$ starting from 6 Aug 2019) (near nadir) with a total swath width of $\sim 2600 \text{ km}$ on the Earth's surface providing daily global coverage and even higher temporal coverage in polar regions. From the measured spectra high resolved trace gas distributions can be retrieved by means of differential optical absorption spectroscopy (DOAS).

We compare slant column densities (SCDs) of chlorine dioxide (OCIO) obtained from TROPOMI measurements with meteorological data and CALIPSO Cloud-Aerosol Lidar with Orthogonal Polarization (CALIOP) polar stratospheric cloud (PSC) observations for both Antarctic and Arctic regions for the time period since TROPOMI launch in 2017 till now.