

EGU21-8987

<https://doi.org/10.5194/egusphere-egu21-8987>

EGU General Assembly 2021

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Stratospheric OCIO observed with ground-based DOAS over Kiruna in the Arctic winters 1996/1997 – 2019/2020

Myojeong Gu¹, Carl-Fredrik Enell², Janis Pukite¹, Ulrich Platt³, Uwe Raffalski⁴, and Thomas Wagner¹

¹Max-Planck Institute for Chemistry, Satellite Remote Sensing, Mainz, Germany (myojeong.gu@mpic.de)

²EISCAT Scientific Association, Kiruna, Sweden

³Institute for Environmental Physics, University of Heidelberg, Heidelberg, Germany

⁴Swedish Institute of Space Physics, Kiruna, Sweden

Recent research on stratospheric ozone indicates signs of ozone recovery, but on the other hand, ozone recovery is also expected to be delayed by many aspects (e.g climate change). Therefore, it is important to monitor continuously stratospheric trace gases to predict the future evolution of the Arctic ozone and other trace gases which are involved in the ozone depletion chemistry. OCIO is well known as an indicator of the stratospheric chlorine activation and can be measured using remote sensing techniques.

In this study, we present long-term measurements of OCIO slant column densities at Kiruna, Sweden (67.84°N, 20.41°E) which were obtained from the ground-based zenith sky DOAS instruments since 1997. The measurement site is located north of the polar circle in which the variability of the OCIO abundance depends on the state of stratospheric chlorine activation but also whether the polar vortex is located above the measurement site.

The aim of this study is to give an overview of the measured stratospheric OCIO abundance for 19 years, and to investigate the dominant parameters affecting ozone and OCIO during periods of stratospheric chlorine activation. One particular focus is on the parameters which trigger the activation and de-activation at the beginning and the end of the polar winter.

To do so, we compare the general dependencies of OCIO on other trace gases and meteorological conditions.