Geophysical Research Abstracts
Vol. 21, EGU2019-2412-2, 2019
EGU General Assembly 2019


# Total ozone loss during the 2018/19 Arctic winter and comparison to previous years

Florence Goutail (1), Jean-Pierre Pommereau (1), Andrea Pazmino (1), Franck Lefevre (1), Cathy Clerbaux (1), Anne Boynard (1), Juliette Hadji-Lazaro (1), Martyn Chipperfield (2), Wuhu Feng (2), Michel Van Roozendael (3), Nis Jepsen (4), Georg Hansen (5), Rigel Kivi (6), Kristof Bognar (7), Kimberly Strong (7), and Kaley A. Walker (7)

(1) LATMOS/IPSL, UVSQ/UPMC/CNRS, Guyancourt, France, (florence.goutail@latmos.ipsl.fr), (2) Institute of Atmospheric Science, School of Earth and Environment, University of Leeds, Leeds, UK, (3) Belgian Institute for Space Aeronomy (BIRA), Brussels, Belgium,, (4) Danish Meteorological Institute, Copenhagen, Denmark,, (5) Norwegian Institute for Air Research, Kjeller, Norway,, (6) Finnish Meteorological Institute, Sodankylä, Finland,, (7) Department of Physics, University of Toronto, Toronto, Canada.

The amplitude of ozone depletion in the Arctic is monitored every year since 1994 by comparison between total ozone measurements of SAOZ / NDACC UV-Vis spectrometers deployed in the Arctic and 3-D chemical transport model simulations in which ozone is considered as a passive tracer.

When SAOZ measurements are missing for various reasons, lack of sunlight, station closed or instrument failure, they are replaced by IASI Metop-A or IASI Metop-B overpasses above the station. These measurements in the thermal Infrared are available all year around, at all latitudes even in the polar night. IASI data have been compared to SAOZ and to 3-D CTM REPROBUS and the agreement is better than 3% at the latitude of the polar circle.

The method allows determining the evolution of the daily rate of the ozone destruction and the amplitude of the cumulative loss at the end of the winter. The amplitude of the destruction varies between 0-10% in relatively warm and short vortex duration years to 25-39% in colder and longer ones.

However, as shown by the unprecedented depletion of 39% in 2010/11, the loss is not only dependent on the extension of the vortex in spring, but also on its strength limiting its re-noxification by import of nitrogen oxide species from the outside, as reported by the rapid increase of total $NO_2$ columns measured by the SAOZ instruments.

Shown in this presentation will be the evolution of ozone loss and re-noxification in the Arctic during the winter 2018/19 compared to that of previous winters.

Compared to observed SAOZ/IASI $O_3$ loss, REPROBUS and SLIMCAT CTM simulations are showing similar losses, however the agreement may vary from one year to the other, depending on the assumptions of vortex strength and isolation. The comparison between ozone loss amplitudes and ozone loss rates, seen each year since 1994 by SAOZ and the two CTM simulations will be followed by a discussion of possible causes in their variable amplitude.