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Twenty-two years Arctic ozone depletion observations and simulations. Is there a trend ?

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The amplitude of ozone depletion in the Arctic is monitored every year since 1994 by comparison between total ozone measurements of eight SAOZ / NDACC UV-Vis spectrometers deployed in the Arctic and 3-D Chemical Transport Model (CTM) simulations in which ozone is considered as a passive tracer. The method allows determining the evolution of the daily rate total ozone depletion and the amplitude of the cumulative loss at the end of the winter.

The amplitude of the destruction varies between 0-10% during a relatively warm and early winter warming, to 25-39% during colder and longer ones. However, as shown by the unprecedented depletion of 39% in 2010/11, the loss does not depend on the vortex spring duration, but also on its strength controlling its renoxification and thus chlorine deactivation by import of nitrogen oxide species from the outside as shown by the total NO₂ columns also measured by SAOZ.

Compared to observed total columns, REPROBUS and SLIMCAT CTM simulations are showing highly variable agreement strongly depending on the assumptions of vortex strength and isolation.

Displayed in the presentation will be the comparison between ozone loss amplitudes seen each year since 1994 and the two model CTM simulations, followed by a discussion of cause of possible changes in their amplitude.