Ozone_cci - Scientific highlights 2020

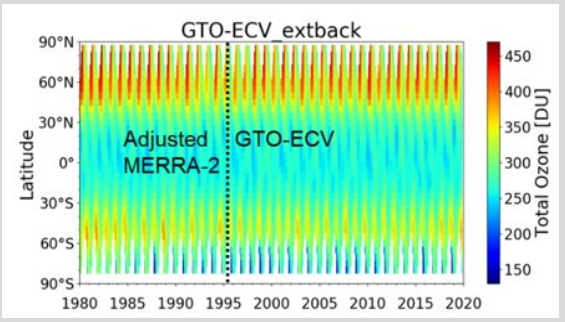
M. Van Roozendael, C. Lerot, J.-C. Lambert, D. Hubert, A. Keppens, J. Vlietinck, D. Balis, K. Garane, M.-L. Koukouli, P.-F. Coheur, C. Wespes, D. Loyola, M. Coldewey-Egbers, K.-P. Heue, M. Dameris, R. Siddans, B. Kerridge, B. Latter, V. Sofieva, R. van der A, O. Tuinder, M. van Weele, A. Rozanov, M. Weber

Abstract: Ozone_cci concentrates on building, documenting and assessing the quality of long time-series of harmonized ozone data sets suitable to investigate the variability and changes in atmospheric ozone. These are obtaind from a combination of space nadir sensors complemented by limb-type instruments allowing for a comprehensive characterization of the ozone vertical distribution at various horizontal scales. In this poster we illustrate a few recent scientific achievements realized using ozone climate data records generated within the project .

Merged GTO-ECV / adjusted MERRA-2 ozone CDR

The GOME-type Ozone ECV (GTO-ECV) data record was combined with the NASA Adjusted-MERRA-2 reanalysis for years prior to 1995.

To reduce potential biases, correction factors estimated on the overlap period (1995-2018) were applied to the entire Adjusted-MERRA-2 total ozone time series. When combined, both data records cover the full period from 1980 to 2020.



Coldewey-Egbers et al., AMT, 2020

Multi-sensor ozone re-analysis since 1957

The Multi-Sensor Reanalysis (MSR) ozone column dataset has been upgraded to allow assimilation of filtered Dobson observations from 1957 to 1978 alongside satellite observations. The resulting MSR time series covers 6 decades and is available at the resolution of 1°x1° .

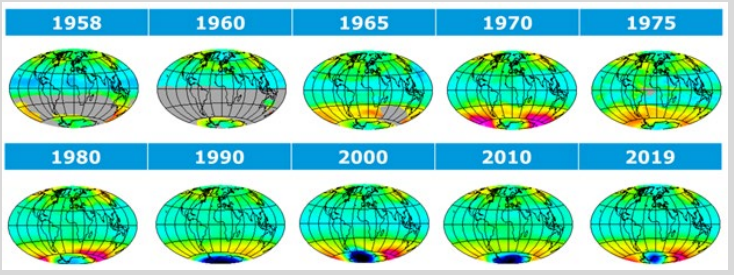
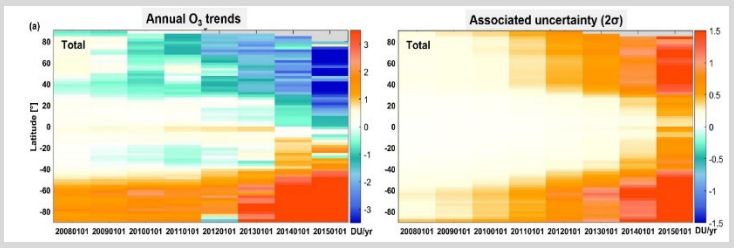


Image © R. van der A, KNMI

Acceleration of the O_3 recovery detected by IASI

Analysis of the first ten years of the IASI/Metop-A ozone data (Jan. 2008 – Dec, 2017) with a multiple linear regression model reveals an ozone recovery at southern middle to high latitudes. This finding is the first detection of a significant concurrent recovery of ozone in the lower stratosphere (LSt), the middle–upper stratosphere (MUSt) and the total column, observed from one single satellite.

Wespes et al., ACP, 2019

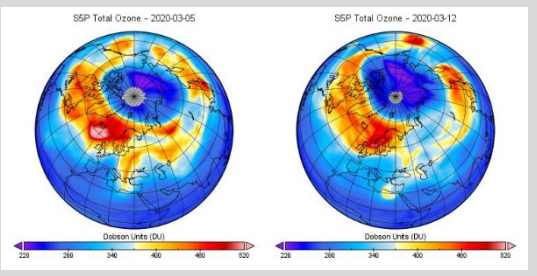


Ozone hole over the Arctic in 2020

Ozone data derived from TROPOMI onboard the Sentinel-5 Precursor satellite show an atypical ozone hole feature in the Arctic polar region in spring 2020. Total column ozone values around or below 220 DU were seen persistently for about 5 weeks in March and early April 2020. It was caused by a combination of dynamical and chemical processes.

This phenomenon is observed for the first time in Arctic spring over the last 40 years.

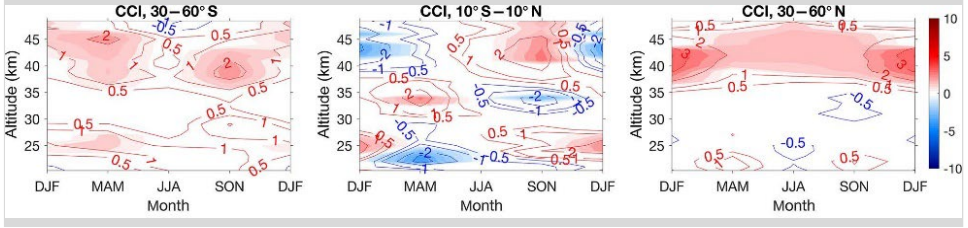
Dameris et al., ACP, 2020



Seasonal stratospheric ozone trends 2000-2018

For the first time, the seasonal dependence of stratospheric ozone trends was studied using CCI merged limb data sets. Such an analysis which reveals altitude and latitude-dependent structures provides more information than usual annual mean trends, useful to better understand the role of dynamics for future ozone recovery predictions.

Szelag et al., ACP, 2020

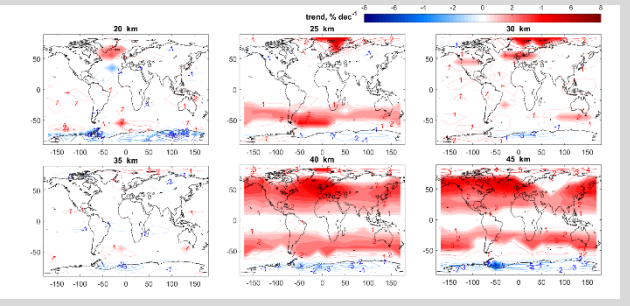


Regional trends of stratospheric ozone 2001-2019

The MErged GRIdded Dataset of Ozone Profiles (MEGRIDOP) in the stratosphere with a resolved longitudinal structure is used for evaluation of regional ozone trends in the stratosphere. It is found that ozone trends exhibit longitudinal structures in the mid-latitude upper stratosphere.

These might be related to changes in the Brewer Dobson circulation.

Sofieva et al., to be submitted to ACP



http://cci.esa.int/ozone/

https://cds.climate.copernicus.eu/portfolio/dataset/satellite-ozone

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