

5.060 Combining modelling with satellite retrievals - reanalysis of global atmospheric composition by the Copernicus Atmosphere Monitoring Service at ECMWF.

Presenting Author:

Johannes Flemming, ECMWF, johannes.flemming@ecmwf.int

Co-Authors:

Antje Inness, ECMWF

Melanie Ades, ECMWF

Jerome Barre, ECMWF

Angela Benedetti, ECMWF

Alessio Bozzo, ECMWF

Richard Engelen, ECMWF

Vincent Huijnen, KNMI

Zak Kipling, ECMWF

Anna Agusti-Panareda, ECMWF

Mark Parrington, ECMWF

Samuel Remy, CNRS

Vincent-Herni Peuch, ECMWF

Abstract:

Meteorological reanalyses data sets such as ERA-interim are widely used to represent the state and trends of the climate system. During the last 10 years, ECMWF has extended the scope of the reanalysis to atmospheric composition by additionally assimilating satellite retrieval of ozone, carbon monoxide, nitrogen dioxide and aerosol optical depth as well as carbon dioxide and methane with the Integrated Forecast System of ECMWF. The latest reanalysis, which covers the period 2003-2017 is currently being produced as part of the Copernicus Atmosphere Monitoring Service (CAMS). The CAMS reanalysis will be made available to users by the end of 2018.

We discuss the impact of the assimilation of the satellite retrievals, which is species specific, by comparing the reanalysis with a control model run. We demonstrate progress made in the composition re-analysis efforts at ECMWF by inter-comparing the latest composition reanalysis with the previous MACC and CAMS interim reanalysis with focus on temporal consistency, which is important for the robust identification of trends from the composition re-analysis. In more detail, we will discuss the decreasing trends in global carbon monoxide since 2003 found in the CAMS reanalysis and relate them to regional trends in the anthropogenic and biomass burning emissions.

Finally, we will suggest to inter-compare the composition reanalyses produced by research centres worldwide.