



Can data assimilation help to quantify chemical ozone loss in the northern hemispheric vortex?

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The dynamic variability caused by vertical and horizontal transport and mixing of air masses makes the determination of the chemical ozone loss over Arctica in the stratosphere very difficult.

Many studies using model calculations have been used to identify the relative contributions of transport and chemistry to the total ozone depletion. Limitations arise from uncertainties in dynamical forcings and in the resolved-scale representation of subgrid-scale transport and of homogenous and heterogenous chemistry, as well as in the vertical and horizontal resolution of the chemistry and transport model.

Assimilation, provided that observational and model errors are accurately prescribed, can be an important tool to point towards model efficiencies (by considering AMF statistics for instance) and to provide 4D fields of constituents ready to make budgets.

In this presentation, we assimilate the measurements of Ozone (O₃) and nitrous oxide (N₂O) from ODIN/SMR in the MOCAGE-PALM assimilation system of Météo-France and CERFACS, in order to quantify the ozone loss in the northern hemispheric vortex during the 2002 - 2003 winter (from November 2002 to March 2003). The assimilation system includes a 3D-CTM with 47 pressure levels from the surface to 5 hPa combined with an assimilation module which based on the 3D-FGAT technique.

The horizontal resolution of the model and analyses is 2° both in latitude and longitude and the vertical resolution is 800 meters in the lower stratosphere. Comparisons with independant measurements will also be presented.