

Stratospheric ozone recovery: Are we there yet?

Peter Braesicke[†]; Luke Abraham; Alex Archibald; Paul Telford; John Pyle

[†] NCAS/University of Cambridge, United Kingdom

Leading author: pb261@cam.ac.uk

Chemistry-climate models are important tools to project the timing of ozone recovery for assessment purposes. WMO 2010 projects possible Antarctic total ozone recovery for a wide range of years, starting from before mid-century to the end of this century. How models represent transport processes in a changing climate is an important source of this uncertainty. A general simplification in many models is the treatment of non-orographic gravity waves, a "motor" for the quasi-biennial oscillation (QBO) and the Brewer-Dobson circulation (BDC), under climate change. Both the QBO and the BDC, have important implications for hemispheric transport, for the removal of halogens from the stratosphere, and indirectly for the timing of ozone recovery. Instead of analysing many transient integrations of different models and their timing for ozone recovery, we will perform a number of mid-century time-slice integrations with one model (UMUKCA). We will characterise the ozone levels relative to a 1990 time-slice integration, depending on the source term specified for the non-orographic gravity waves. Changes in transport will be monitored using N₂O PDFs; the ratio of ozone between mid-century experiments and 1990 will be used as a metric to monitor how close different versions of the model are to recovery. This will help us to understand how important this parameter uncertainty can be in projecting ozone return dates.