

Chemical hindcast experiments using a GCM

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Brief Abstract:

Chemical data assimilation provides a tool for exploiting the wealth of data available from satellite instruments such as those on the NASA UARS/EOS and ESA Envisat platforms. A data assimilation scheme, based on a sub-optimal Kalman filter, has been incorporated into a stratospheric version of the UK Met Office Unified Model with stratospheric chemistry. In this study, UARS MLS ozone data will be assimilated using this model system. Conducting selected hindcast experiments, we will assess the potential for improving model forecast skill through the assimilation of observed ozone. The model heating rates will be calculated by either using the climatological background ozone (non-interactive) or the assimilated ozone (interactive). By carefully analysing non-interactive and interactive hindcasts, we will be furthering our understanding of chemistry-climate interactions and the mechanisms determining the distribution of trace gases in the atmosphere. This model setup will also be used to compare the performance of the Kalman filter for different underlying chemistry schemes (i.e. Cariolle vs full chemistry).