



Supplement of

C-IFS-CB05-BASCOE: stratospheric chemistry in the Integrated Forecasting System of ECMWF

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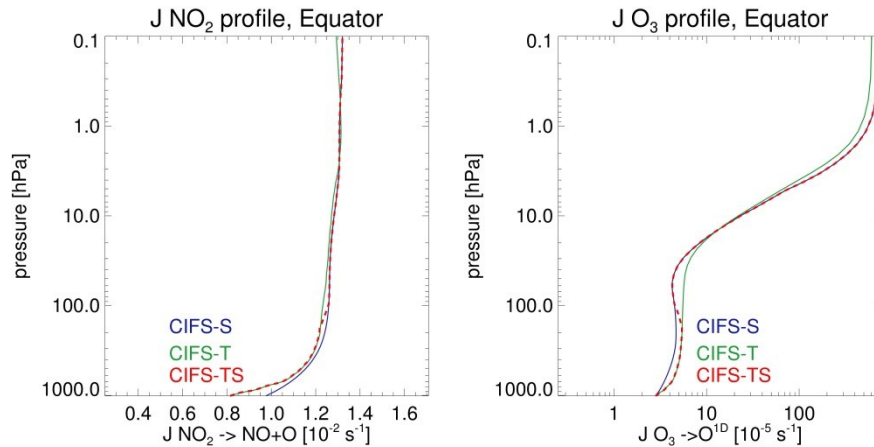


Figure S1. Instantaneous photolysis rates for NO_2 and O_3 at 0°N , 180°W , on 1 October 2008, 0 UTC. Solid blue (CIFS-S) refers to the stratospheric parameterization, solid green (CIFS-T) to tropospheric, and dashed red (CIFS-TS) to the merged profile of the rate.

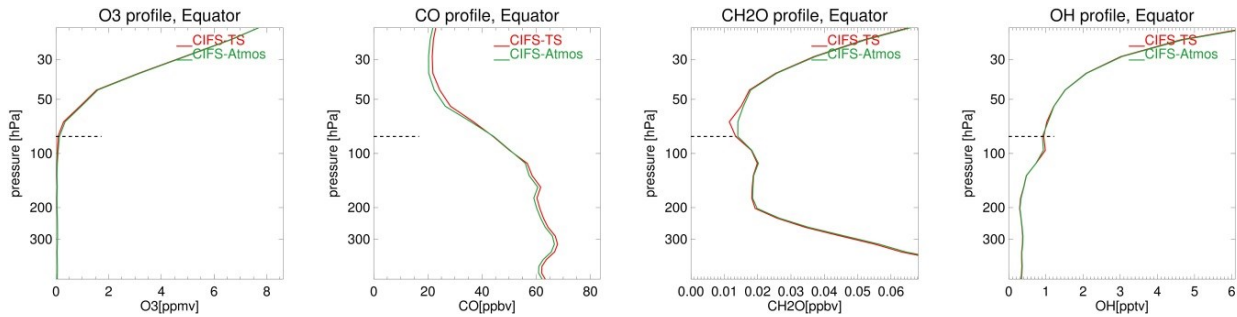


Figure S2. Instantaneous profiles of O_3 , CO , CH_2O and OH at 0°N , 180°W , on 1 October 2008, 0 UTC, for runs C-IFS-TS (red) and C-IFS-Atmos (green). The dashed line denotes the chemical tropopause level associated with the switch in the chemistry mechanism.

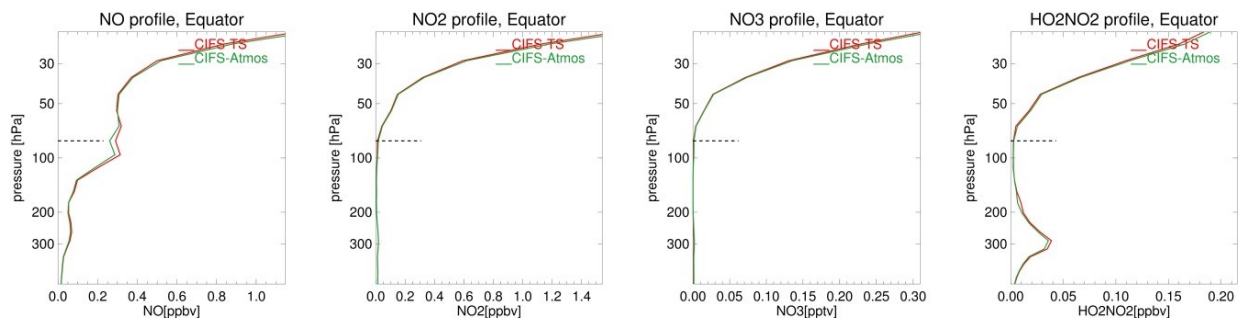


Figure S3. Same as Figure S2 but now showing NO , NO_2 , NO_3 and HO_2NO_2 .

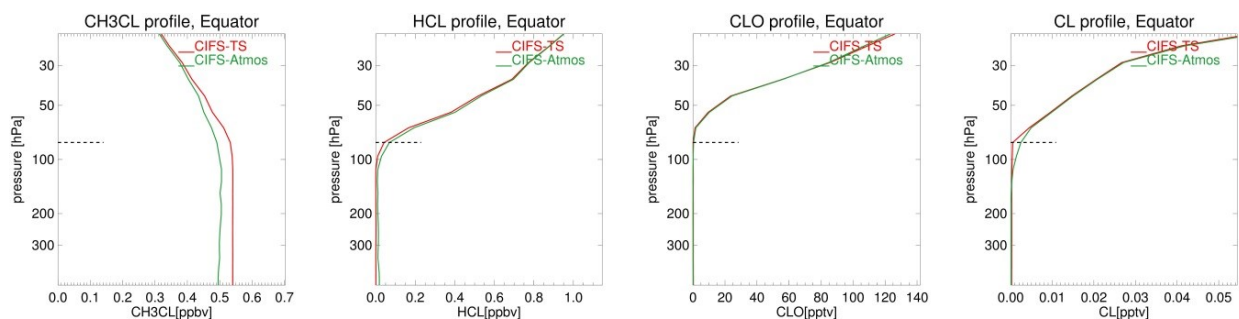


Figure S4. Same as Figure S2 but now showing CH_3Cl , HCl , ClO and Cl . Note that for these trace gases in C-IFS-TS only transport is activated in the troposphere.

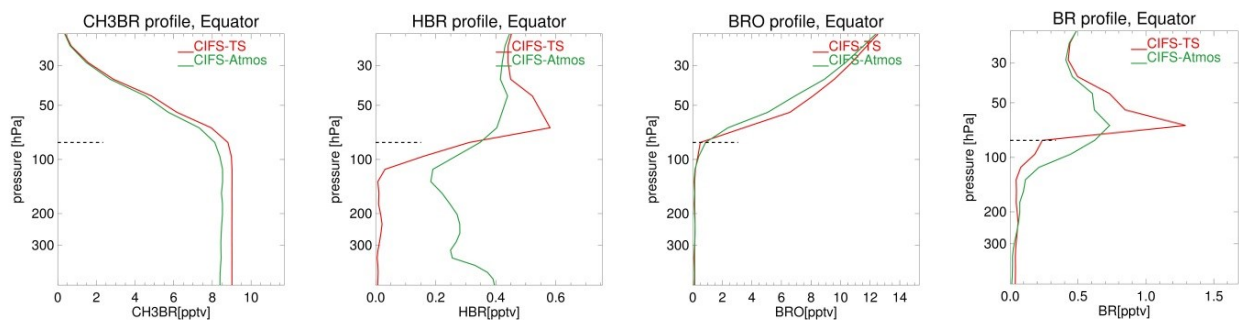


Figure S5. Same as Figure S2 but now showing CH_3Br , HBr , BrO and Br . Note that for these trace gases in C-IFS-TS only transport is activated in the troposphere.

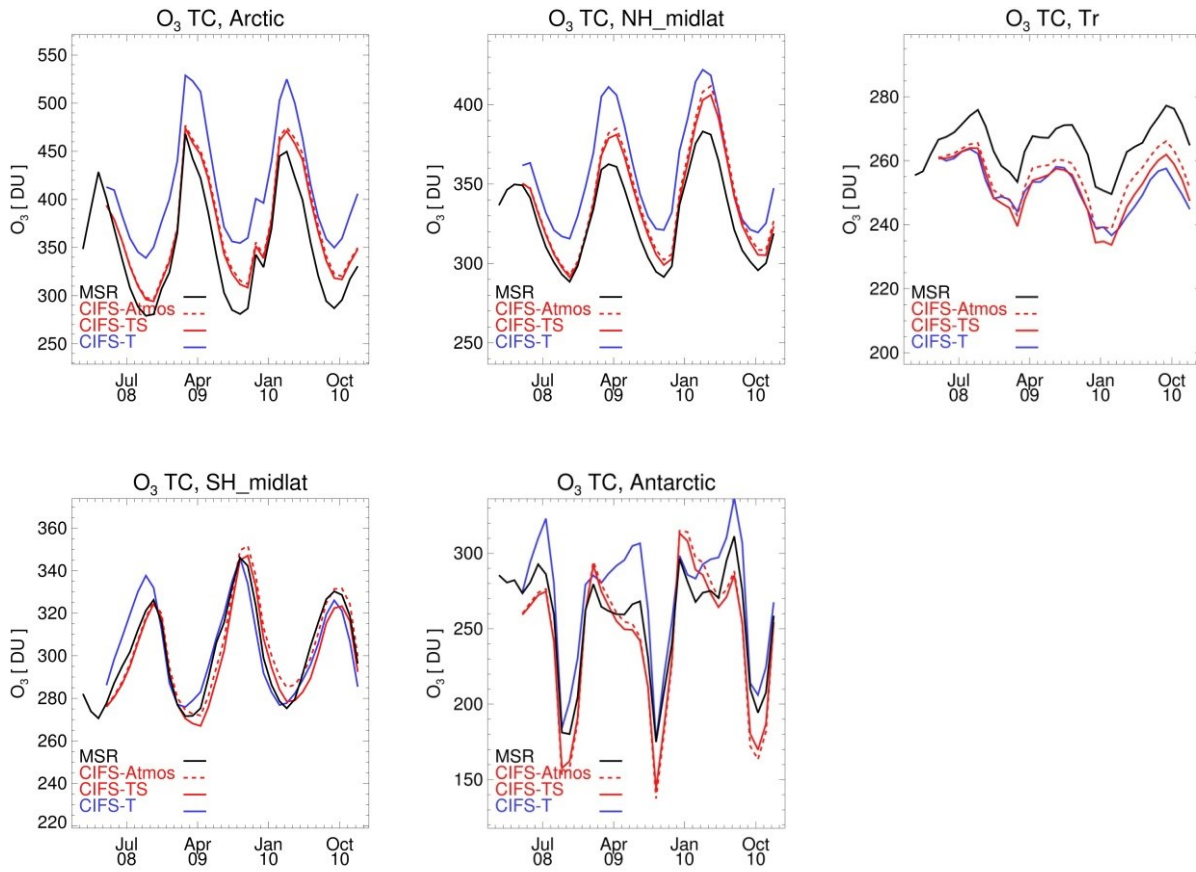


Figure S6. Evaluation of C-IFS-TS (red, solid), C-IFS-Atmos (red, dashes) and CIFS-T (blue) monthly mean O_3 total columns in Dobson Units against the Multi-Sensor Reanalysis for the Arctic (90°N - 70°N), Northern Hemisphere mid-latitudes (60°N - 30°N), tropics (30°N - 30°S), Southern Hemisphere mid-latitudes (30°S - 60°S) and Antarctica (70°S - 90°S).

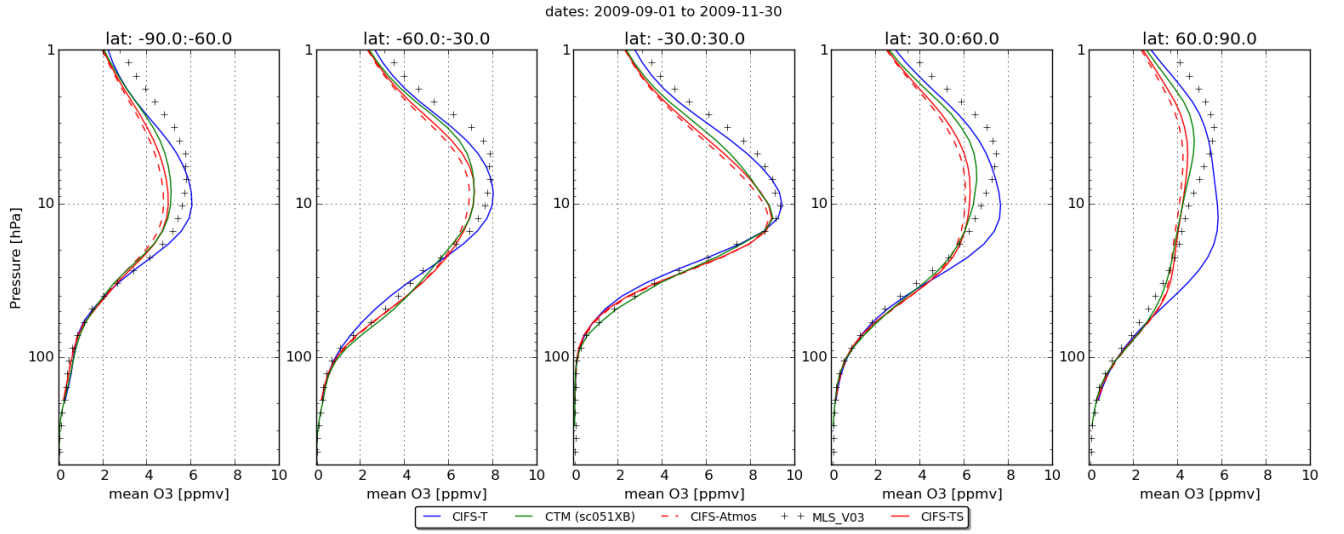


Figure S7. Zonal mean profiles of stratospheric O_3 using MLS observations (black symbols) and co-located output of BASCOE-CTM (green lines), C-IFS-TS (red solid lines) and C-IFS-Atmos (red dashed lines). The zonal means are shown separately on five columns corresponding to the latitude bands 90°S - 60°S , 60°S - 30°S , 30°S - 30°N , 30°N - 60°N and 60°N - 90°N , respectively.

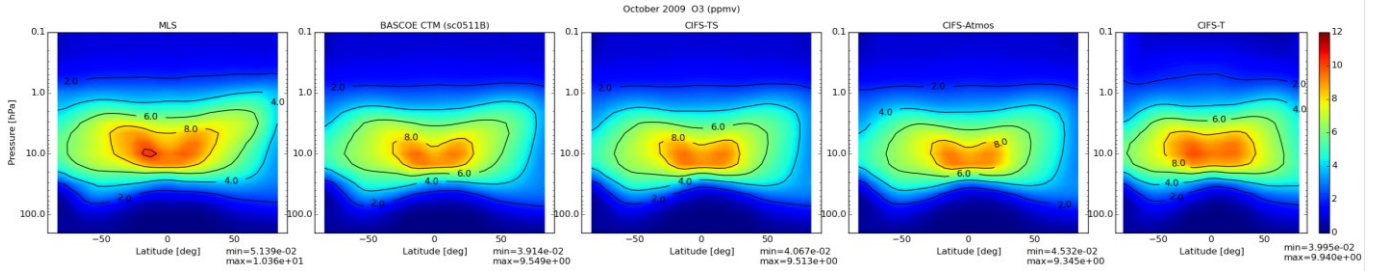


Figure S8. Zonal mean stratospheric O_3 (units ppmv) for October 2009 using MLS observations (first column) and co-located output of BASCOE-CTM (second), C-IFS-TS (third), C-IFS-Atmos (fourth) and C-IFS-T (fifth).