



*Supplement of*

## **Pan-Arctic surface ozone: modelling vs. measurements**

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## Supplementary Materials

Table S1. A size-dependent non-seasonal SSA bromine depletion factor (DF) derived from previous work of Yang et al. (2008, 2010) and Breider et al. (2009).

Dry NaCl diameter ( $\mu\text{m}$ )	DF
<0.4	0.00
0.64	0.02
0.9	0.20
1.26	0.38
1.78	0.47
2.52	0.50
3.36	0.48
5.0	0.43
7.1	0.38
10.0	0.36
>10	0.00

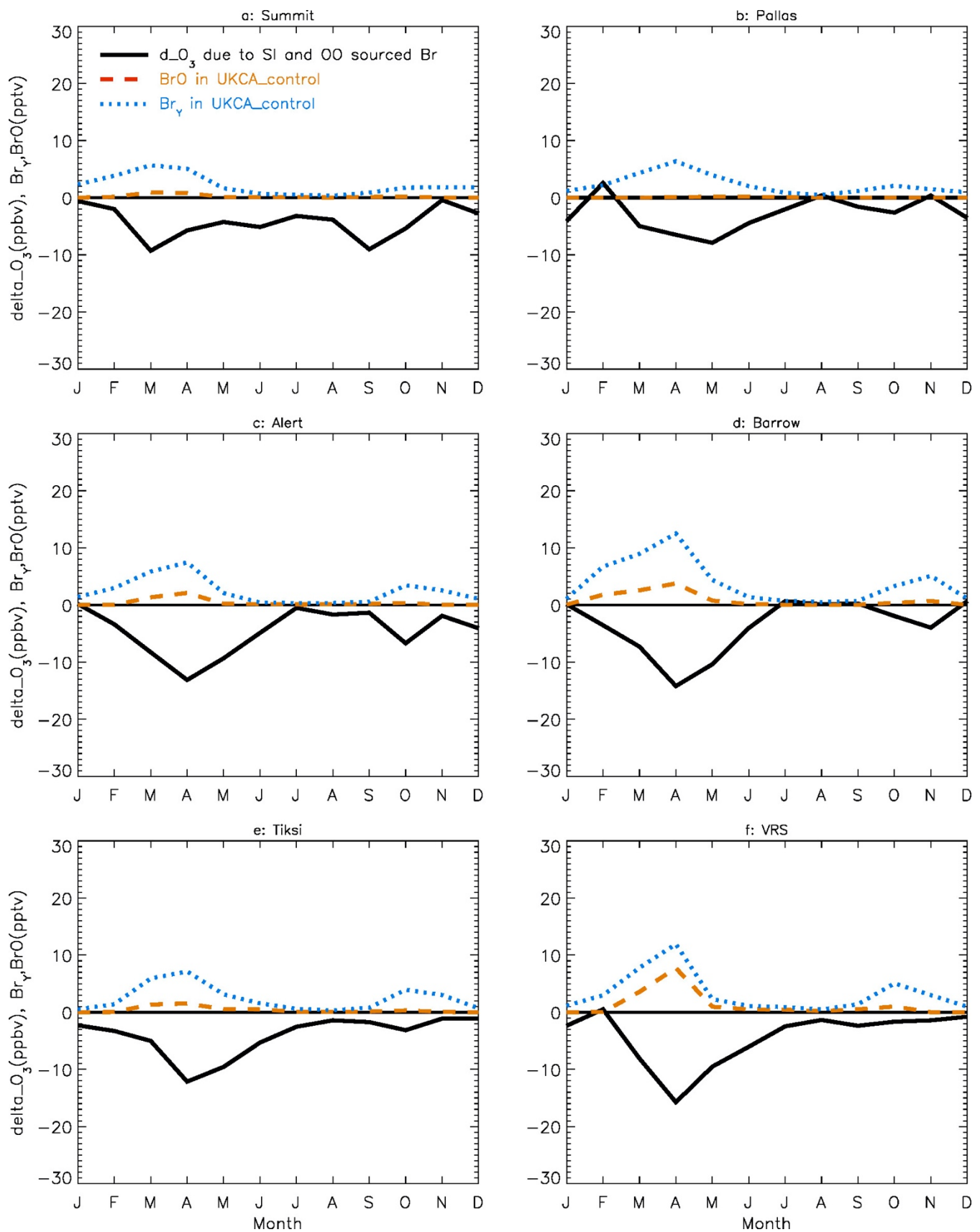


Figure S1: Similar to Fig. 2 but for UKCA model results (averaged from an integration of 2006-2008). Solid black line (=UKCA\_control -UKCA\_VSLS) represents the effect from both SI- and OO-sourced bromine. Total inorganic  $Br_Y$  (dotted blue line) and  $BrO$  (dash orange line) from UKCA\_control are also plotted.

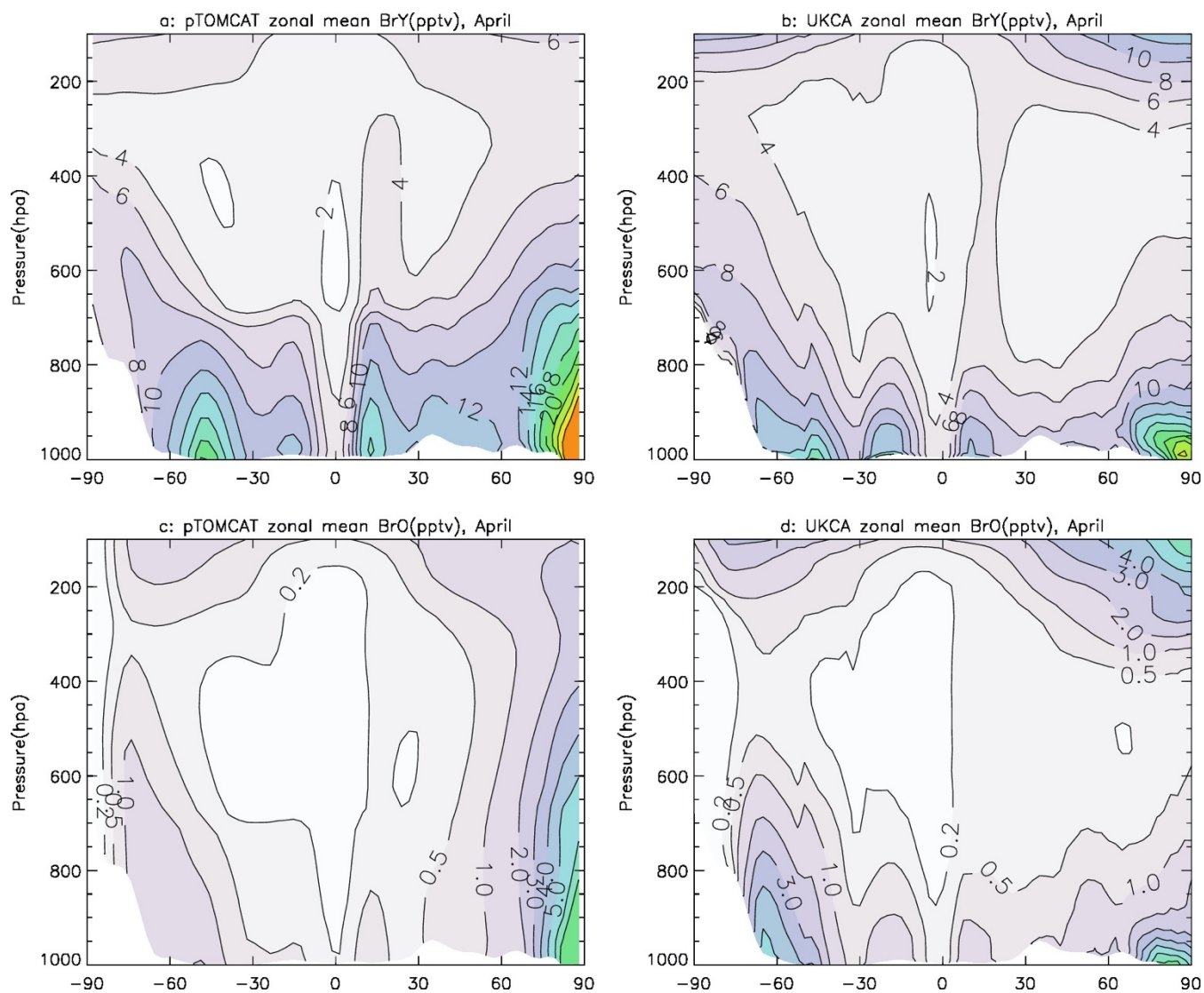


Figure S2: April zonal mean BrY (pptv) (a, c) and BrO (pptv) (b, d) in pTOMCAT\_control run (left) and UKCA\_control run (right), respectively, values are taken from a three-year integration (2007-2009).

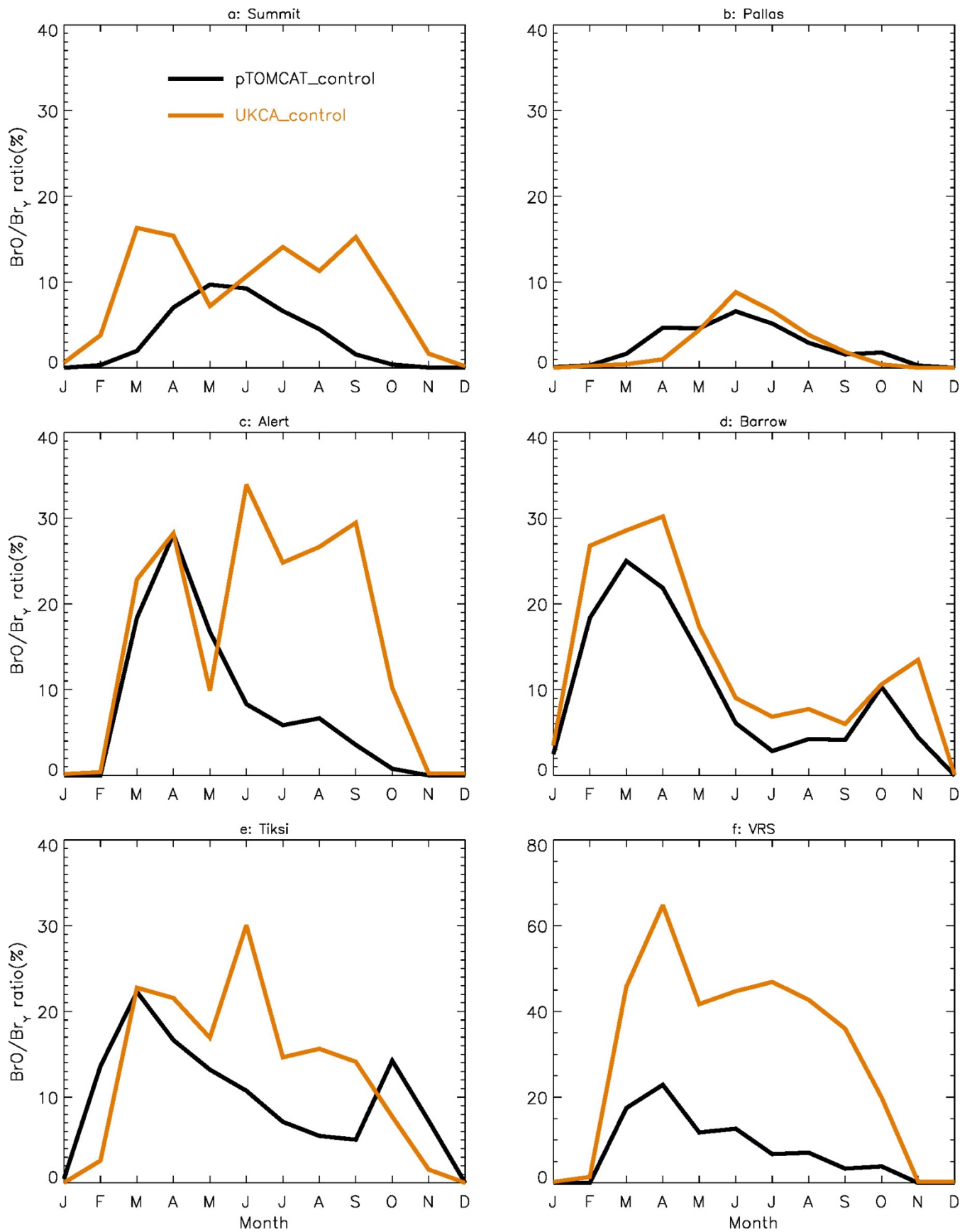


Figure S3: Monthly mean BrO/Br<sub>Y</sub> ratio (in percentage) from pTOMCAT\_control (black line) and UKCA\_SI\_OO\_VSLs (orange line).

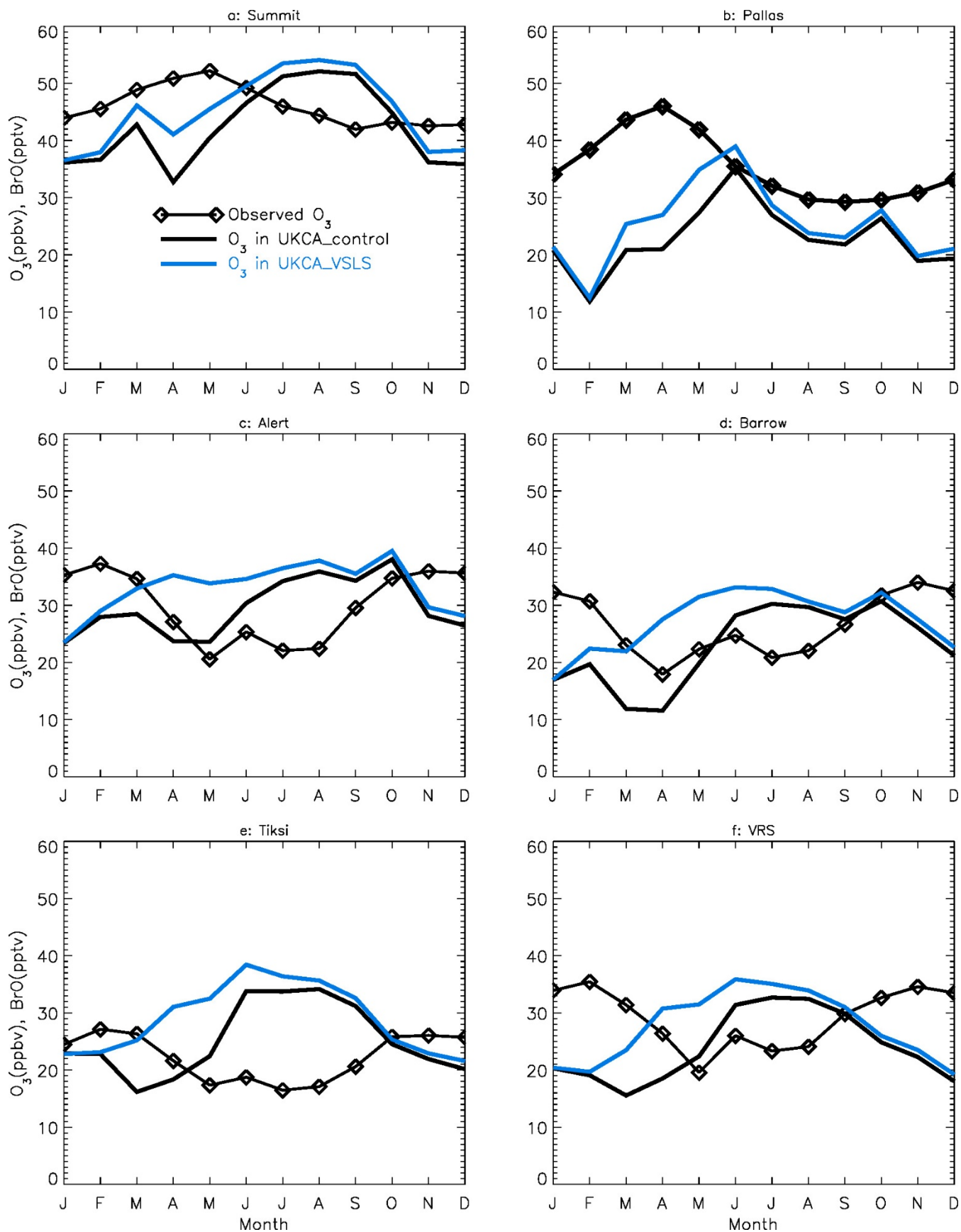


Figure S4: Same as Fig. 2 but for model output from UKCA\_control (black line) and UKCA\_VSLS (blue line).

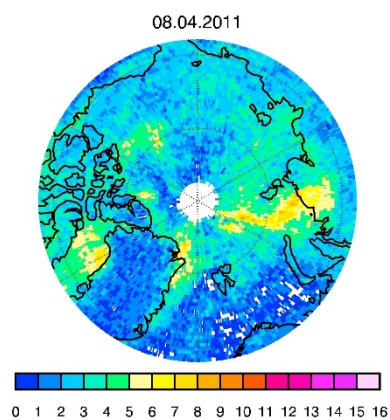
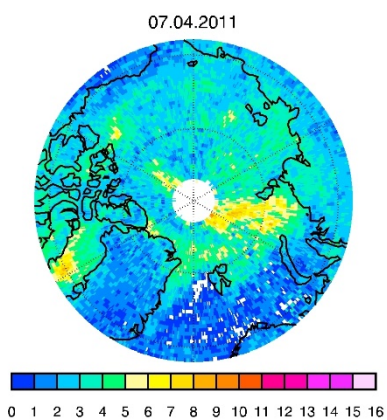
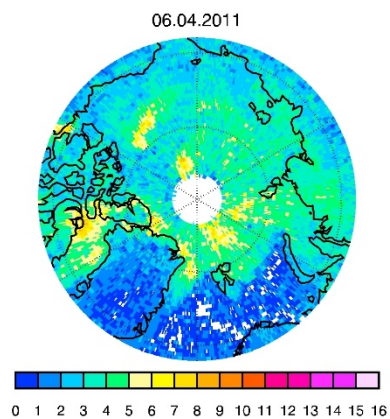
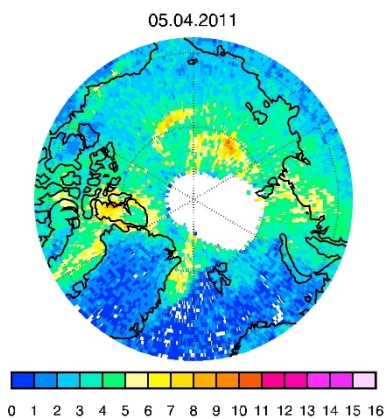
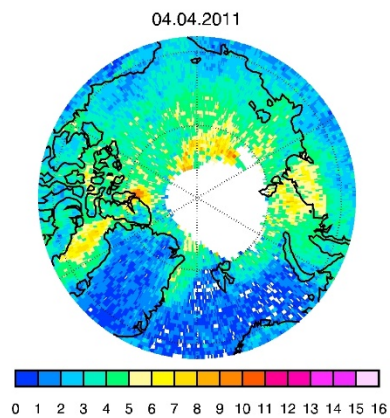
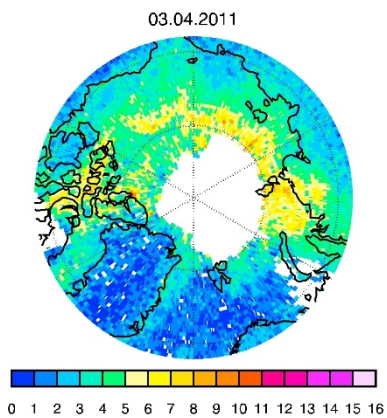
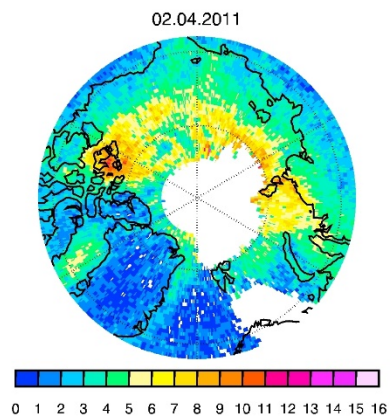
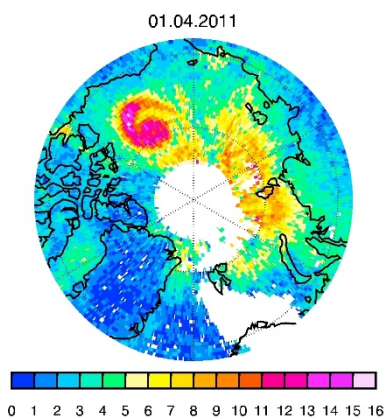


Figure S5: GOME-2 tropospheric vertical column densities of BrO ( $\times 10^{13}$  molecules  $\text{cm}^{-2}$ ) during the time period of 1-8 April 2011.

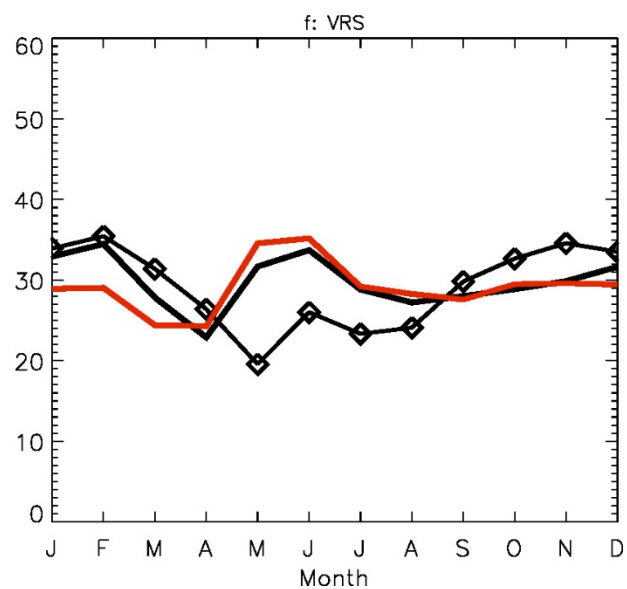
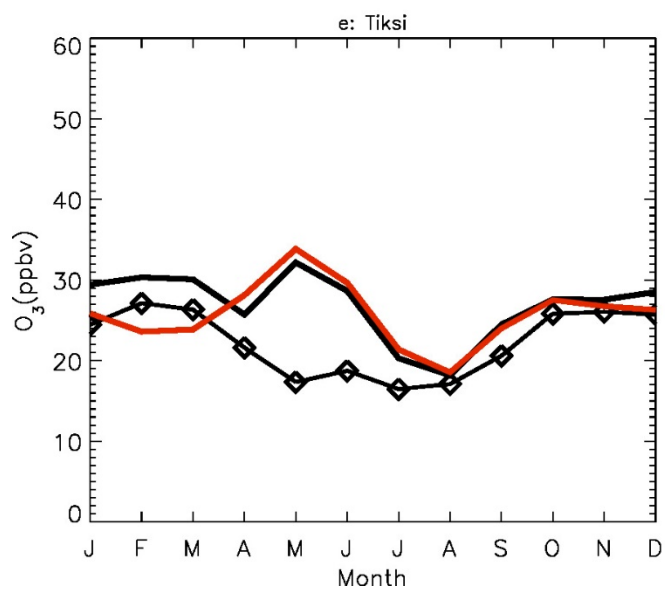
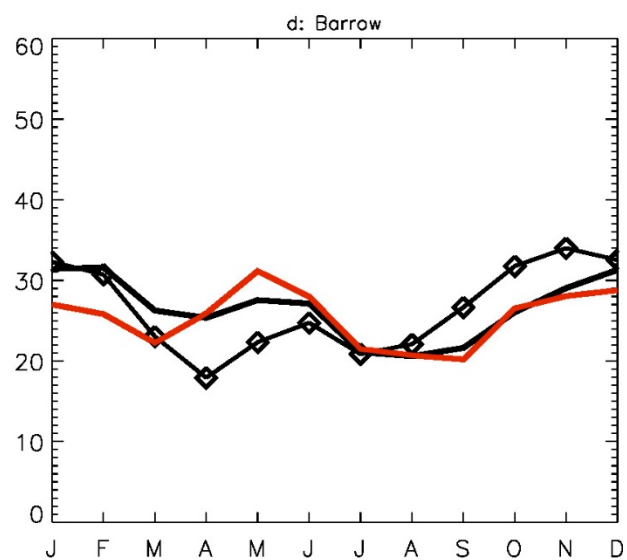
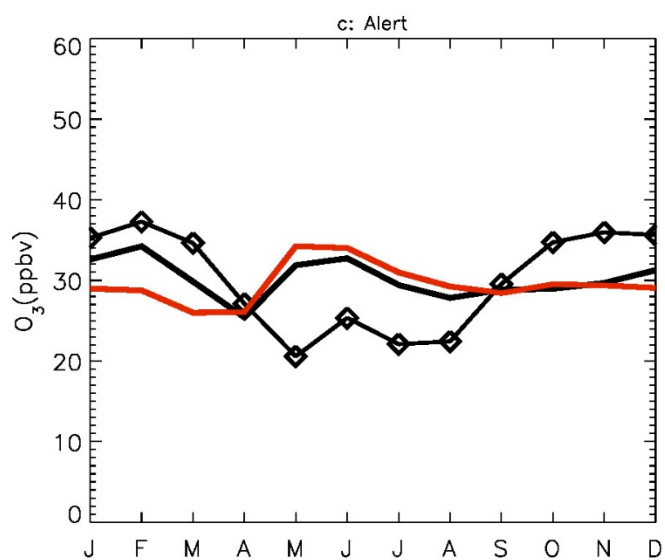
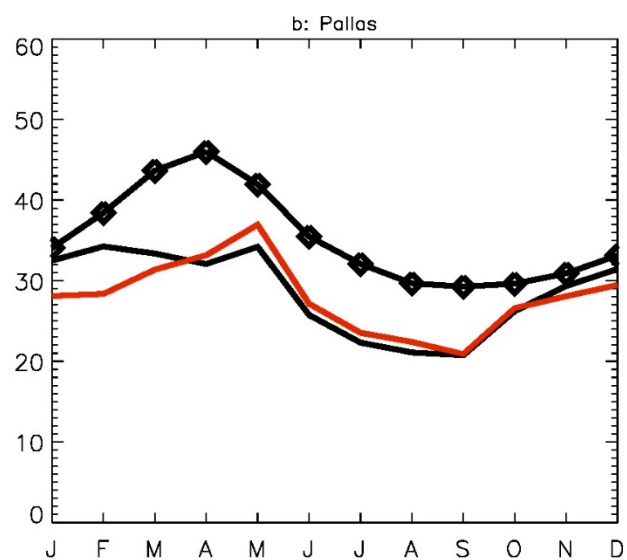
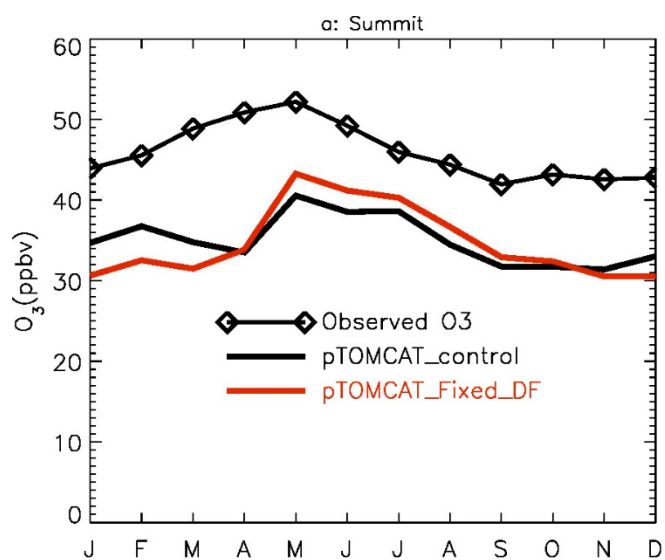
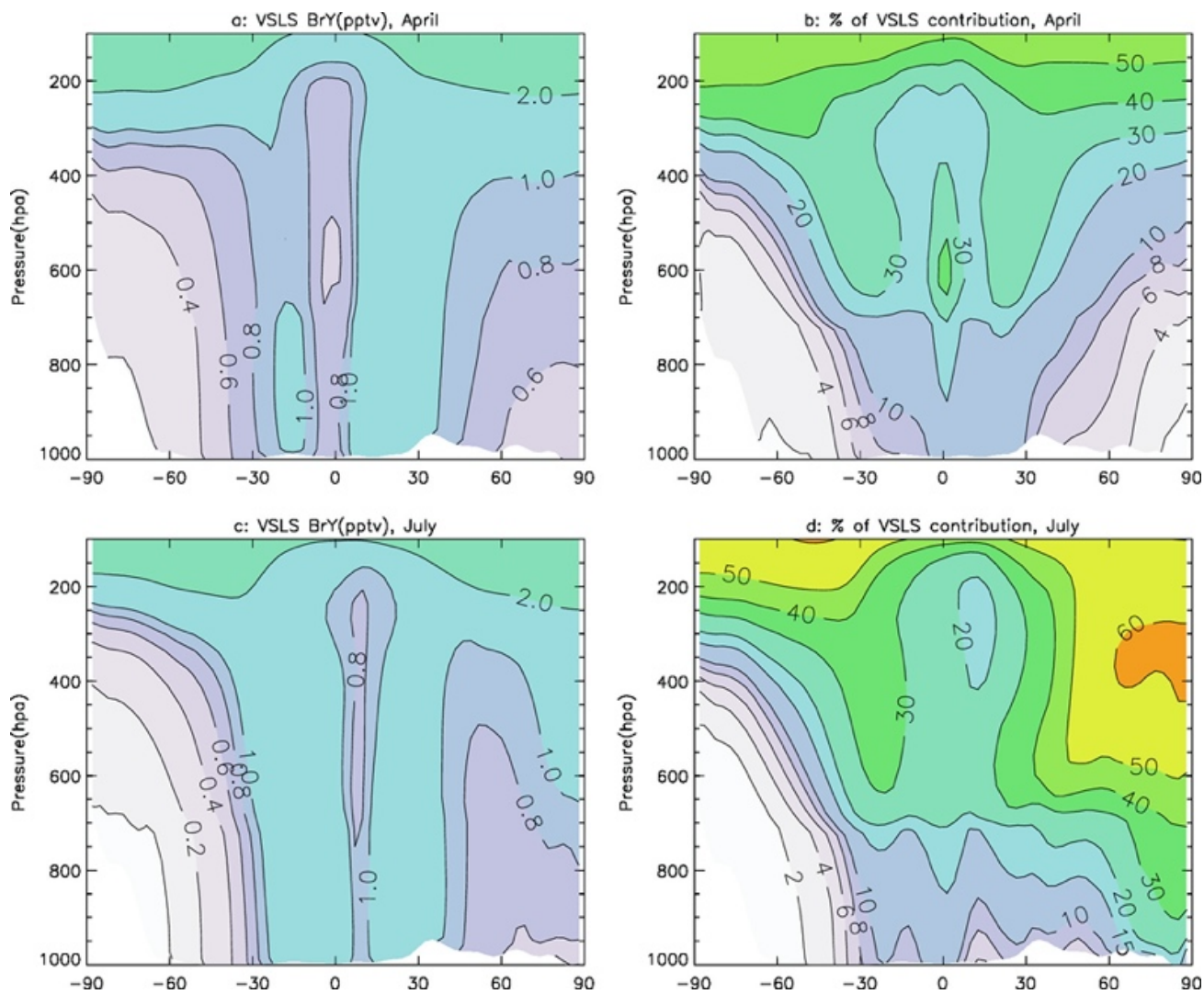


Figure S6: Same as Fig. 2 but for model ozone from pTOMCAT\_Fixed\_DF run (red line). pTOMCAT\_control result is shown in black.



5 Figure S7: Zonal mean of VSLs BrY (pptv) and percentage contribution to total BrY in April (a, b) and July (c, d). Values are from a 3-years p-TOMCAT integration.