

**Table S1:** Percentage (%) changes in important model metrics, between 2100 and 2000 (RCP2.6). Variables examined (from left to right) are: global tropospheric air mass-weighted mean OH concentration, global chemical methane lifetime, total NO<sub>x</sub> emissions (including lightning), total lightning NO<sub>x</sub> emissions, total CO emissions, total NMVOC emissions, global atmospheric methane burden, global tropospheric ozone burden, global mean stratospheric ozone column, global volume-weighted tropospheric mean J(O<sup>1</sup>D), and global tropospheric mean temperature and humidity.

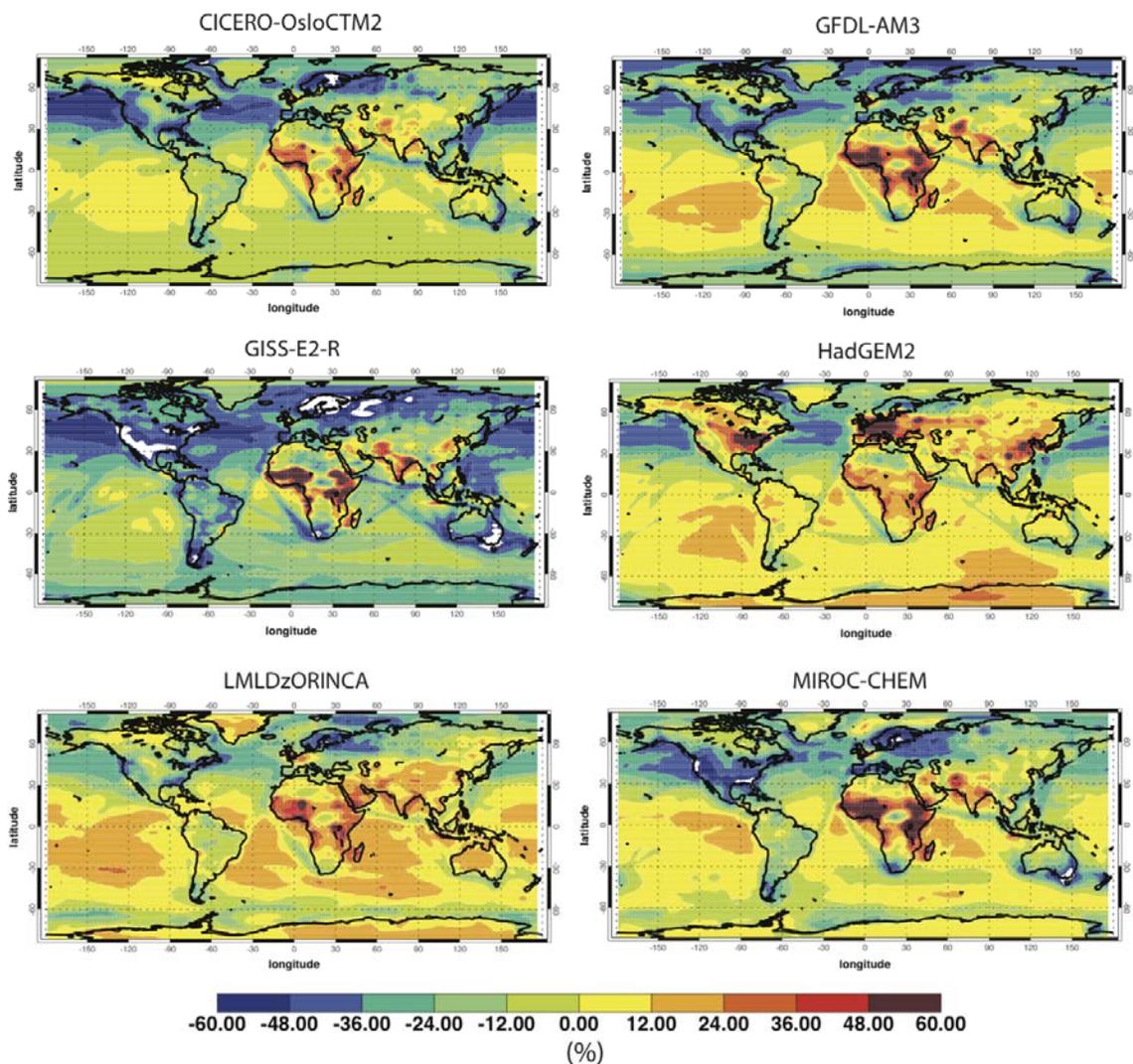
<b>Models (RCP2.6)</b>	<b>OH</b>	<b><math>\tau_{\text{CH}_4}</math></b>	<b>NO<sub>x</sub> Emis.</b>	<b>LiNO<sub>x</sub> Emis.</b>	<b>CO Emis.</b>	<b>NMVOC Emis.</b>	<b>CH<sub>4</sub> Burd.</b>	<b>O<sub>3</sub> Burd.</b>	<b>Strat. O<sub>3</sub></b>	<b>J(O<sup>1</sup>D)</b>	<b>T</b>	<b>Q</b>
CESM-CAM-superfast	-	-	-	-	-	-	-	-	-	-	-	-
CICERO-OsloCTM2	+3.7	-1.3	-42.6	0.0	-39.9	-5.1	-27.3	-18.5	-0.2	-	0.0	0.0
CMAM	-	-	-	-	-	-	-	-	-	-	-	-
EMAC	-	-	-	-	-	-	-	-	-	-	-	-
GEOSCCM	-	-	-	-	-	-	-	-	-	-	-	-
GFDL-AM3	+12.4	-13.4	-47.0	+12.6	-36.9	-5.0	-27.9	-14.0	+3.3	-0.6	+0.9	+14.6
GISS-E2-R	-7.3	+6.9	-44.2	+3.8	-42.8	+0.5	-21.0	-5.0	+8.0	-7.0	+0.4	+6.1
HadGEM2	7.3	-9.0	-49.7	+19.6	-29.0	-21.1	-28.5	-13.0	7.2	-	+0.6	+9.3
LMDzORINCA	+17.7	-17.0	-45.8	+15.7	-42.2	-10.0	-44.5	-18.5	-0.2	-	+0.7	-
MIROC-CHEM	+11.4	-12.7	-36.0	+7.5	-43.1	-7.1	-28.2	-16.4	+2.6	+0.2	+0.7	-10.0
MOCAGE	-4.7	+2.1	-45.7	+5.2	-39.4	-6.5	-28.8	-4.8	+19.9	-	+0.4	+7.1
NCAR-CAM3.5	-9.2	+9.5	-51.2	+3.2	-36.9	-7.8	-28.6	-21.0	+3.4	-2.7	+0.0	+0.9
STOC-HadAM3	-1.4	-0.6	-42.9	+4.7	-39.4	-1.7	-28.4	-22.4	+4.8	-1.2	+0.6	+8.7
UM-CAM	+6.6	-9.5	-40.6	+8.1	-39.0	-11.3	-27.9	-7.4	+6.7	+0.1	+0.6	+8.9
Mean	+3.7	-4.5	-44.0	+7.2	-53.0	-7.5	-29.1	+14.1	+5.6	-1.9	+0.5	+6.9
± stand. dev.	±9.0	±9.1	±4.0	±5.5	±27.0	±5.6	±5.9	±6.5	±5.8	±2.7	±0.3	±4.7

**Table S2:** Same as Tab. S1, but for RCP4.5.

<b>Models (RCP4.5)</b>	<b>OH</b>	<b><math>\tau_{\text{CH}_4}</math></b>	<b>NO<sub>x</sub> Emis.</b>	<b>LiNO<sub>x</sub> Emis.</b>	<b>CO Emis.</b>	<b>NMVOC Emis.</b>	<b>CH<sub>4</sub> Burd.</b>	<b>O<sub>3</sub> Burd.</b>	<b>Strat. O<sub>3</sub></b>	<b>J(O<sup>1</sup>D)</b>	<b>T</b>	<b>Q</b>
CESM-CAM-superfast	-	-	-	-	-	-	-	-	-	-	-	-
CICERO-OsloCTM2	+5.3	-2.4	-43.1	0.0	-44.8	-5.1	-9.5	-10.2	-0.2	-	0.0	0.0
CMAM	+9.1	-12.2	-41.8	-25.0	-39.7		-10.2	-8.0	+3.5	-1.3	+1.1	+18.9
EMAC	+9.7	-11.5	-39.0	+0.3	-49.7	+3.5	-9.9	-8.8	+3.0	+0.7	+1.0	+15.5
GEOSCCM												
GFDL-AM3	+19.4	-19.0	-41.5	+23.5	-47.4	-3.6	-9.3	-4.1	+3.9	-1.4	+1.3	+22.6
GISS-E2-R	-2.2	+0.1	-39.2	+12.2	-54.9	+6.9	+4.6	-0.4	+8.8	-6.1	+0.8	+12.5
HadGEM2	+21.2	-19.5	-44.9	+31.2	-37.2	-26.3	-10.0	-0.9	+8.3	-	+0.9	+16.7
LMDzORINCA	-	-	-	-	-	-	-	-	-	-	-	-
MIROC-CHEM	-	-	-	-	-	-	-	-	-	-	-	-
MOCAGE	-	-	-	-	-	-	-	-	-	-	-	-
NCAR-CAM3.5	-1.7	+0.6	-48.3	+8.3	-47.4	-5.3	-10.2	-12.5	+3.3	-1.8	+0.5	+7.3
STOC-HadAM3	-	-	-	-	-	-	-	-	-	-	-	-
UM-CAM	+17.2	-17.8	-36.0	+17.5	-50.4	-9.2	-8.7	+1.4	+6.9	+0.1	+1.1	+17.7
Mean	+9.8	-10.2	-41.7	+8.5	-46.4	-4.9	-7.9	-5.4	+4.7	-1.6	+0.8	+13.9
± stand. dev.	±9.1	±8.5	±3.8	±17.3	±5.8	±11.5	±5.1	±5.1	±3.1	±2.4	±0.4	±7.2

**Table S3:** Same as Tab. S1, but for RCP6.0.

<b>Models (RCP6.0)</b>	<b>OH</b>	<b><math>\tau_{\text{CH}_4}</math></b>	<b>NO<sub>x</sub> Emis.</b>	<b>LiNO<sub>x</sub> Emis.</b>	<b>CO Emis.</b>	<b>NMVOC Emis.</b>	<b>CH<sub>4</sub> Burd.</b>	<b>O<sub>3</sub> Burd.</b>	<b>Strat. O<sub>3</sub></b>	<b>J(O<sup>1</sup>D)</b>	<b>T</b>	<b>Q</b>
CESM-CAM-superfast	-	-	-	-	-	-	-	-	-	-	-	-
CICERO-OsloCTM2	-	-	-	-	-	-	-	-	-	-	-	-
CMAM	-	-	-	-	-	-	-	-	-	-	-	-
EMAC	-	-	-	-	-	-	-	-	-	-	-	-
GEOSCCM	-	-	-	-	-	-	-	-	-	-	-	-
GFDL-AM3	+8.1	-11.6	-45.8	+25.4	-22.9	-2.6	-4.6	-3.2	+4.7	-1.7	+1.6	+27.7
GISS-E2-R	-16.0	+16.0	-42.4	+16.2	-26.2	+11.1	+24.9	+4.3	+10.6	-9.4	+1.0	+17.1
HadGEM2	-	-	-	-	-	-	-	-	-	-	-	-
LMDzORINCA	+12.6	-15.3	-48.3	+38.7	-26.0	-6.1	-18.8	-11.4	-0.1		+1.7	
MIROC-CHEM	+7.2	-11.2	-31.6	+19.0	-25.8	-3.1	-5.2	-10.2	+3.5	+0.5	+1.5	+4.1
MOCAGE	-10.5	+7.1	-48.1	+12.3	-24.4	-3.3	-7.0	+1.7	+21.3		+1.0	+15.1
NCAR-CAM3.5	-11.7	+7.0	-47.0	+18.0	-22.9	-3.8	-7.3	-16.9	+3.0	-0.5	+1.0	+16.4
STOC-HadAM3	-	-	-	-	-	-	-	-	-	-	-	-
UM-CAM	-	-	-	-	-	-	-	-	-	-	-	-
Mean	-1.7	-1.3	-43.0	+18.2	-24.7	-1.3	-3.0	-5.9	+7.2	-2.8	+1.3	+16.1
± stand. dev.	±12.3	±13	±6.7	±4.8	±1.5	±6.2	±14.6	±8.2	±7.8	±4.5	±0.3	±8.4



**Figure S1:** Change in surface annual mean OH concentration between 2000 and 2100 in RCP2.6, in all models. The bottom model layer results have been used as representative for the surface.

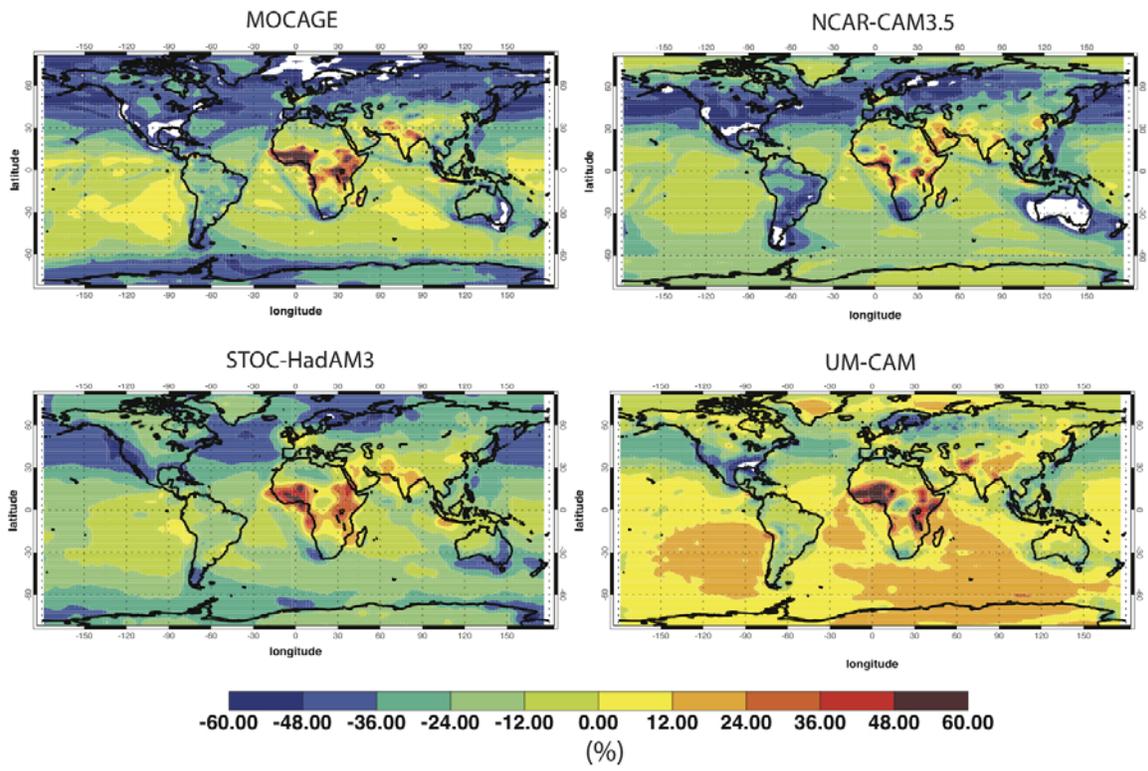
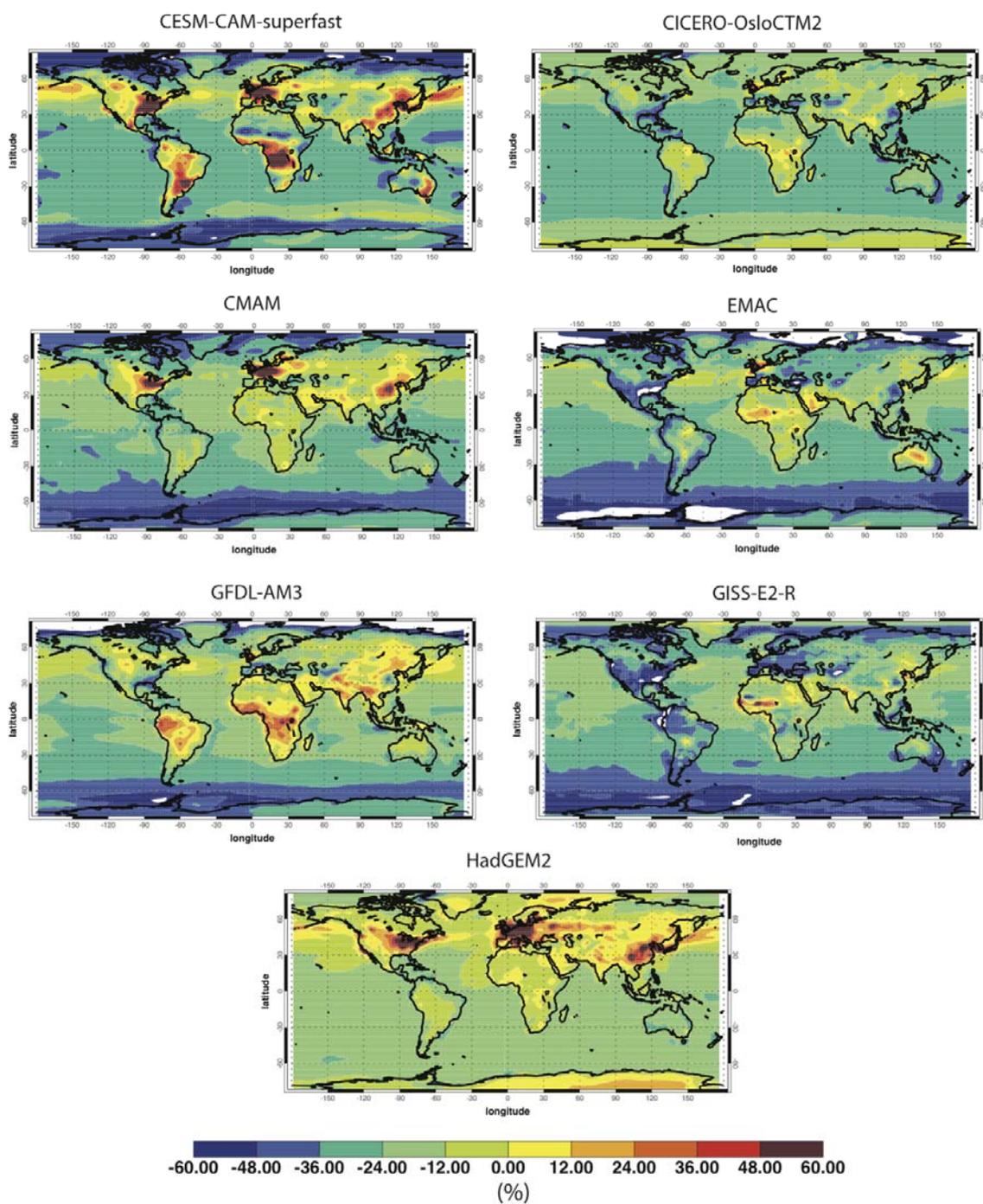


Figure S1 (continued)



**Figure S2:** Change in surface annual mean OH concentration between 2000 and 2100 in RCP8.5, in all models. The bottom model layer results have been used as representative for the surface.

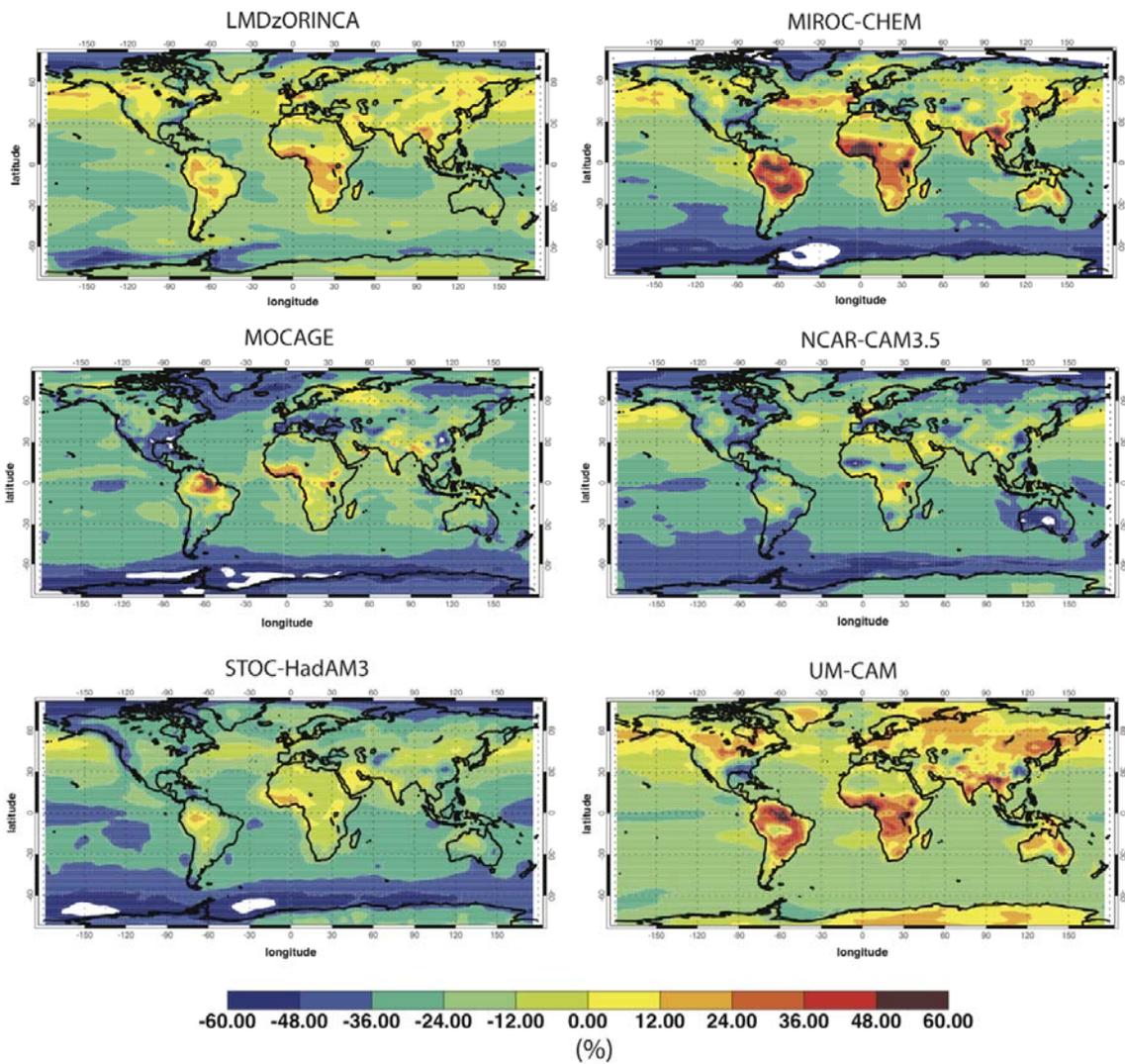
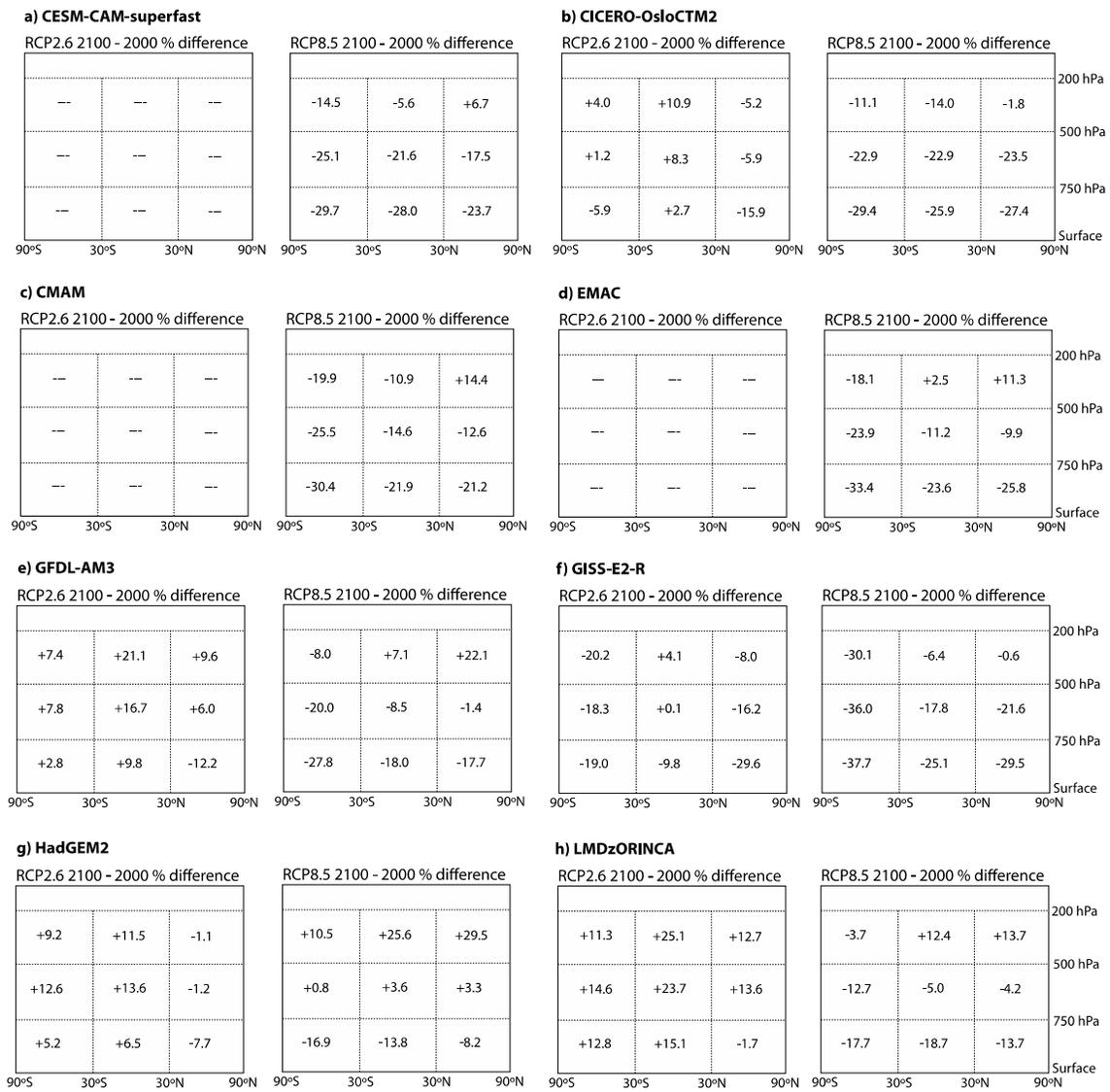


Figure S2 (continued)



**Figure S3:** Change in annual mean OH concentration between 2000 and 2100 in RCP2.6 in different tropospheric subdomains, for all models.

**i) MIROC-CHEM**

RCP2.6 2100 - 2000 % difference

+8.1	+19.5	+12.7
+6.6	+17.8	+8.4
+0.3	+9.4	-11.5

RCP8.5 2100 - 2000 % difference

-9.7	+19.3	+21.2
-21.8	-5.6	-10.2
-31.6	-23.0	-24.7

**j) MOCAGE**

RCP2.6 2100 - 2000 % difference

-11.6	+3.4	-23.0
-10.0	+4.5	-20.1
-7.9	-0.7	-26.5

RCP8.5 2100 - 2000 % difference

-21.4	-7.7	-15.0
-31.9	-15.0	-24.2
-32.5	-24.2	-31.7

200 hPa  
500 hPa  
750 hPa  
Surface

**k) NCAR-CAM3.5**

RCP2.6 2100 - 2000 % difference

-12.5	-5.0	-12.2
-13.1	-3.2	-12.8
-19.6	-8.5	-25.5

RCP8.5 2100 - 2000 % difference

-16.1	+3.7	+1.3
-25.6	-14.2	-14.9
-34.3	-25.7	-24.2

**l) STOC-HadAM3**

RCP2.6 2100 - 2000 % difference

-4.5	+6.6	-2.8
-6.3	+5.0	-6.7
-14.7	-4.7	-21.4

RCP8.5 2100 - 2000 % difference

-8.6	-0.6	+14.2
-21.4	-15.6	-9.5
-32.1	-25.0	-22.3

200 hPa  
500 hPa  
750 hPa  
Surface

**m) UM-CAM**

RCP2.6 2100 - 2000 % difference

+2.9	+3.7	-1.2
+12.4	+13.1	+9.3
+8.7	+5.7	-9.4

RCP8.5 2100 - 2000 % difference

+8.1	+24.7	+21.3
+1.6	+6.8	+8.6
-14.0	-13.6	-10.7

**Figure S3 (continued)**