



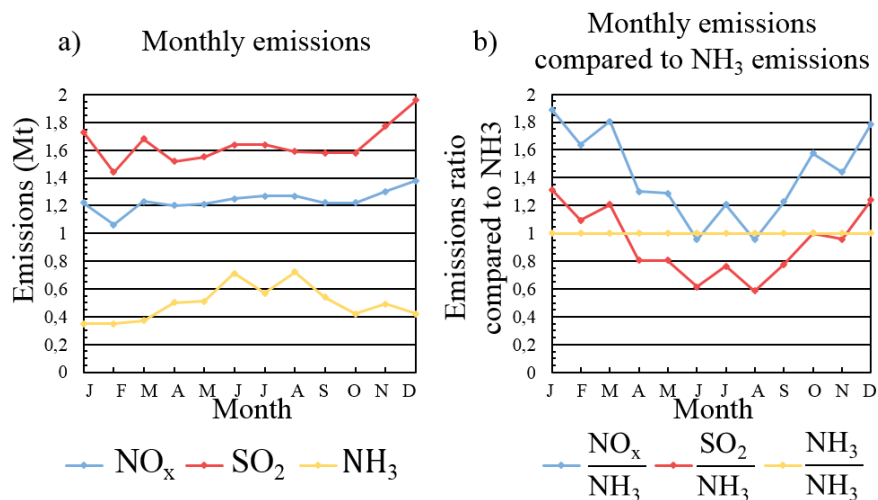
*Supplement of*

## **The unintended consequence of SO<sub>2</sub> and NO<sub>2</sub> regulations over China: increase of ammonia levels and impact on PM<sub>2.5</sub> concentrations**

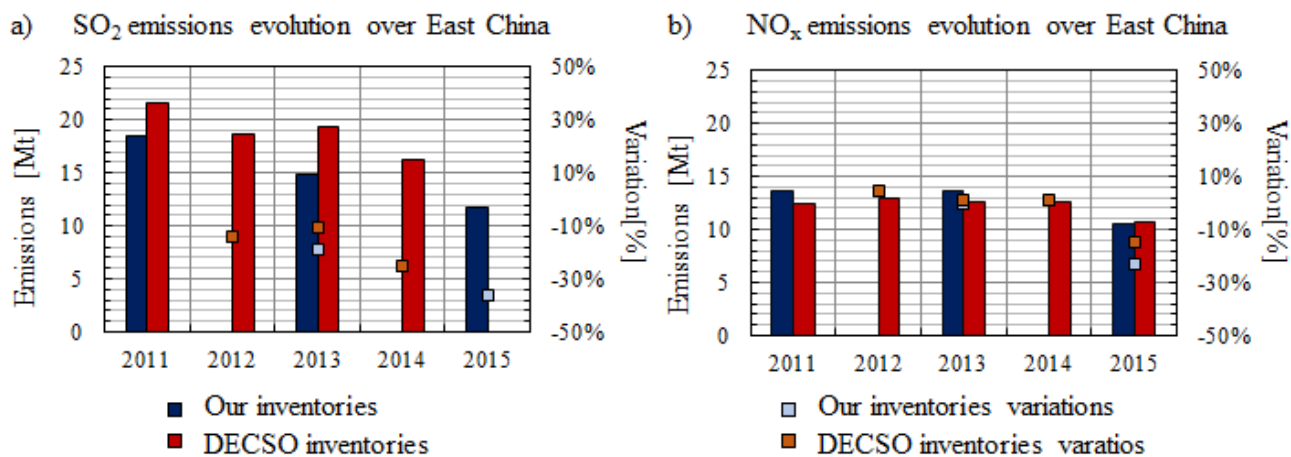
**Mathieu Lachatre et al.**

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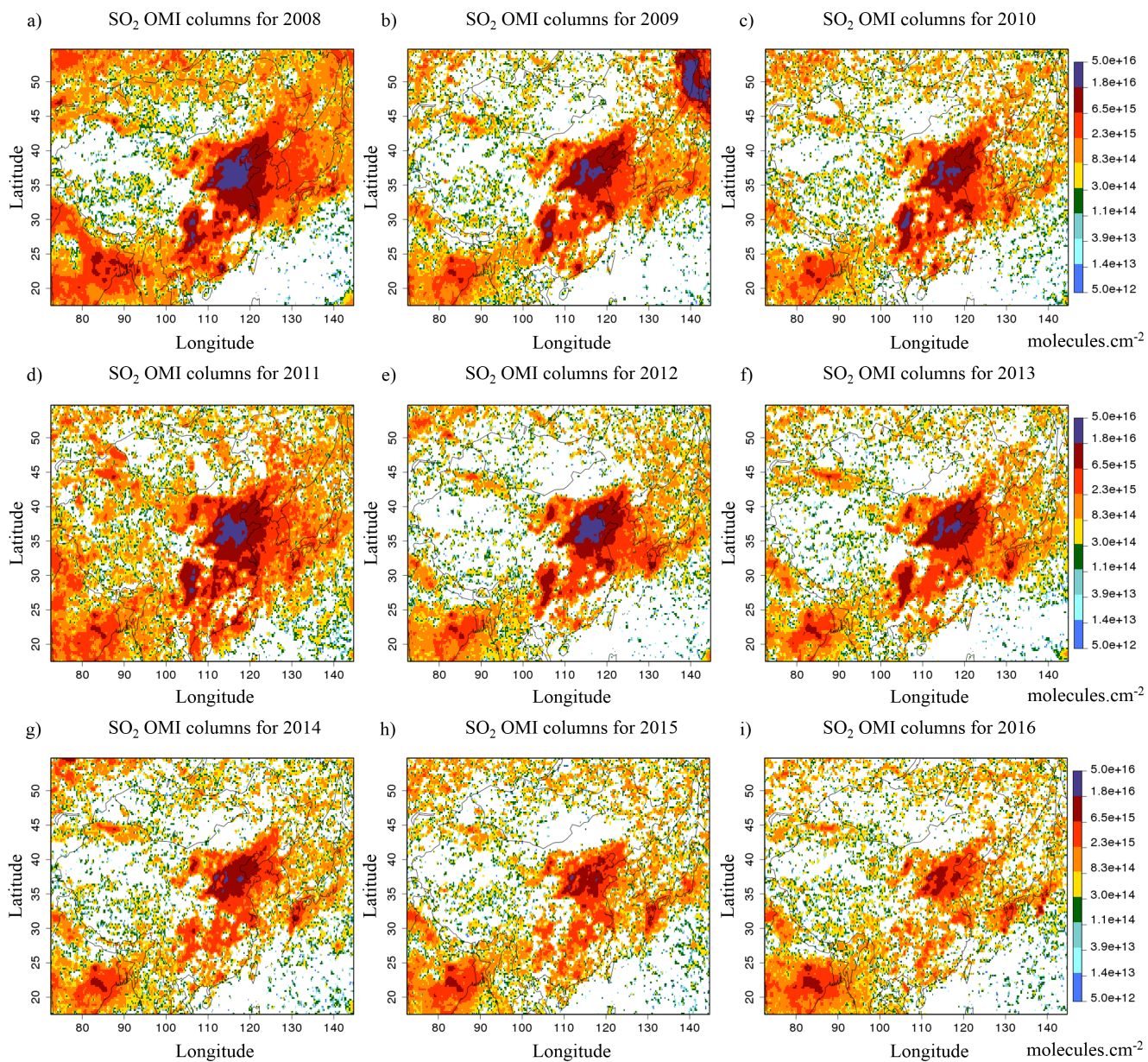
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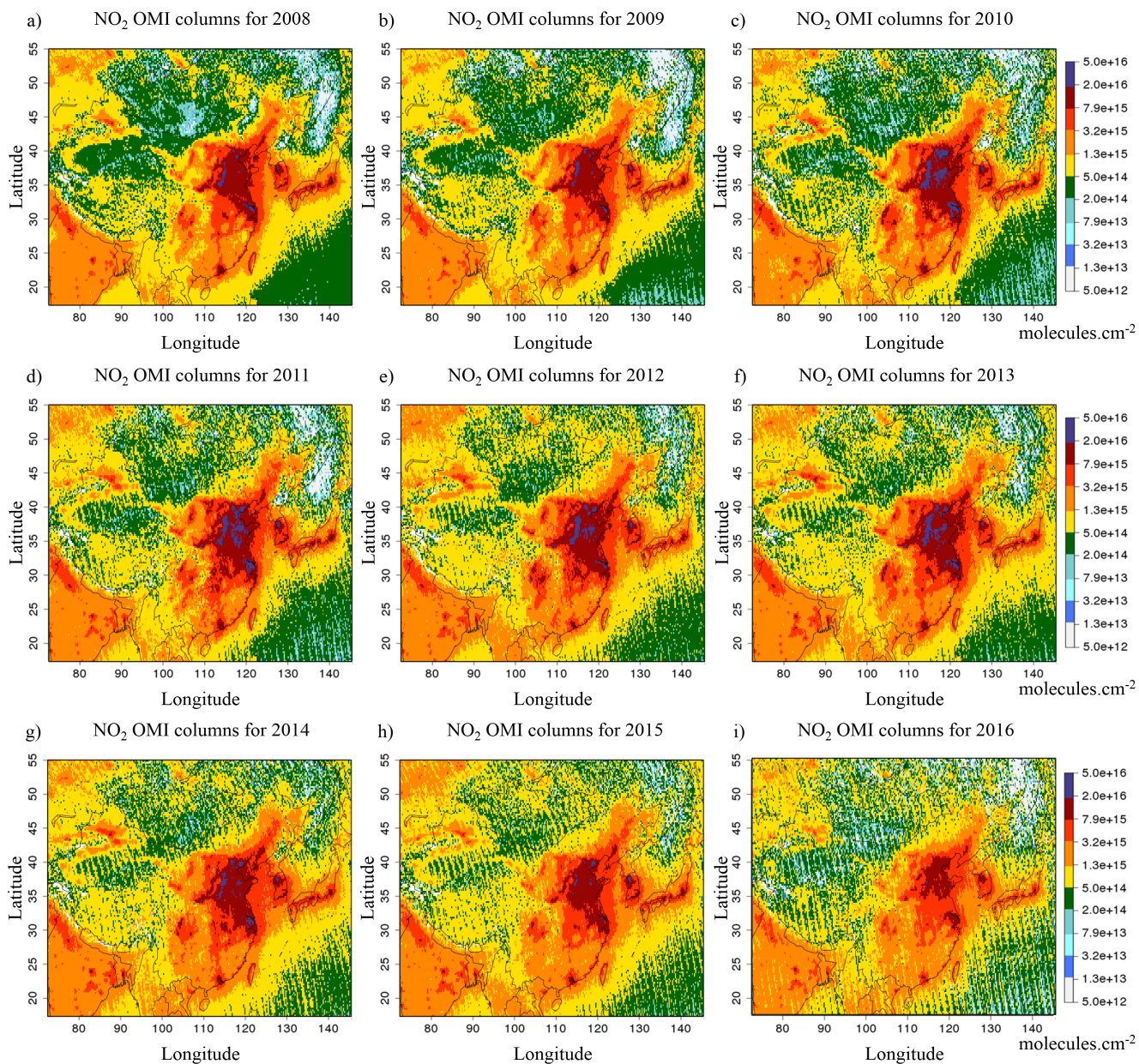
**Figure S1.** a) Emissions monthly profile for East China from HTAP 2010, in Mt b) emissions monthly profile molar ratio compared to  $\text{NH}_3$  emissions, from HTAP 2010.



**Figure S2.** a)  $\text{SO}_2$  and b)  $\text{NO}_x$  emission inventories comparison between our updated inventory and DECSO inventory, Over East China, not including maritime traffic.

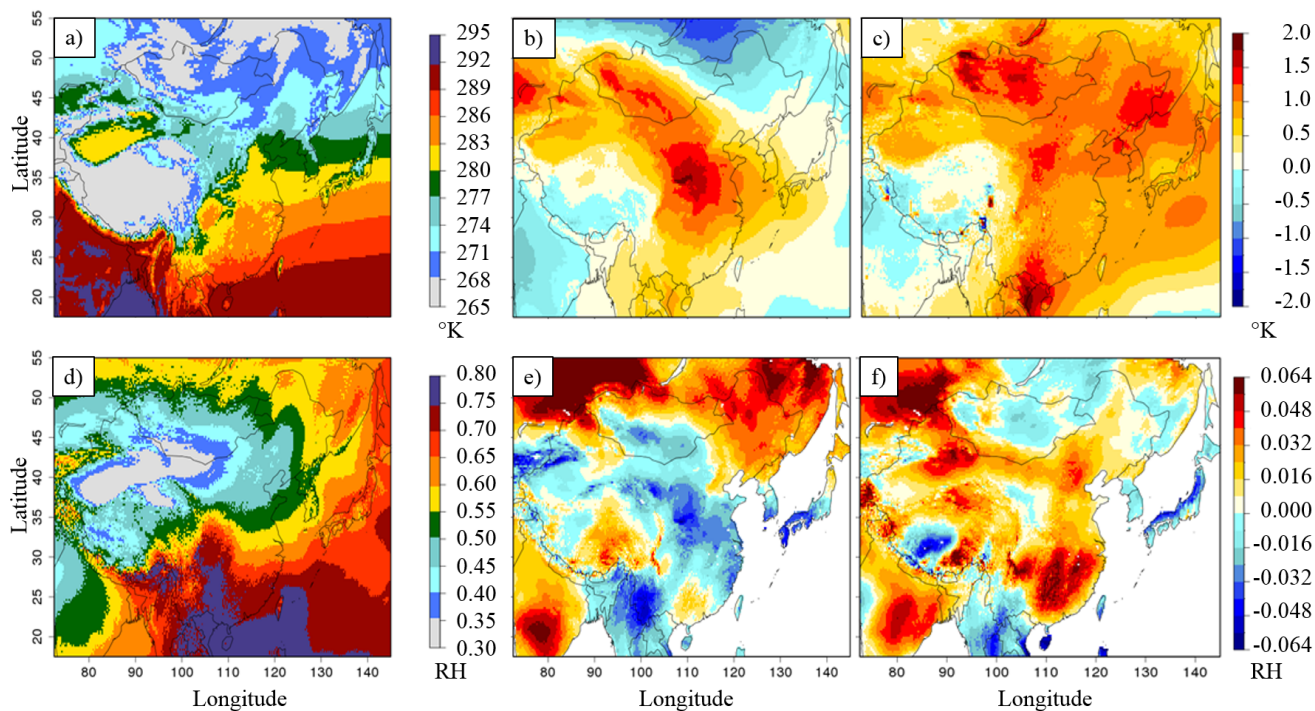


**Figure S3.** SO<sub>2</sub> columns evolution from OMI satellite, from 2008 to 2016, in molecules.cm<sup>-2</sup>.

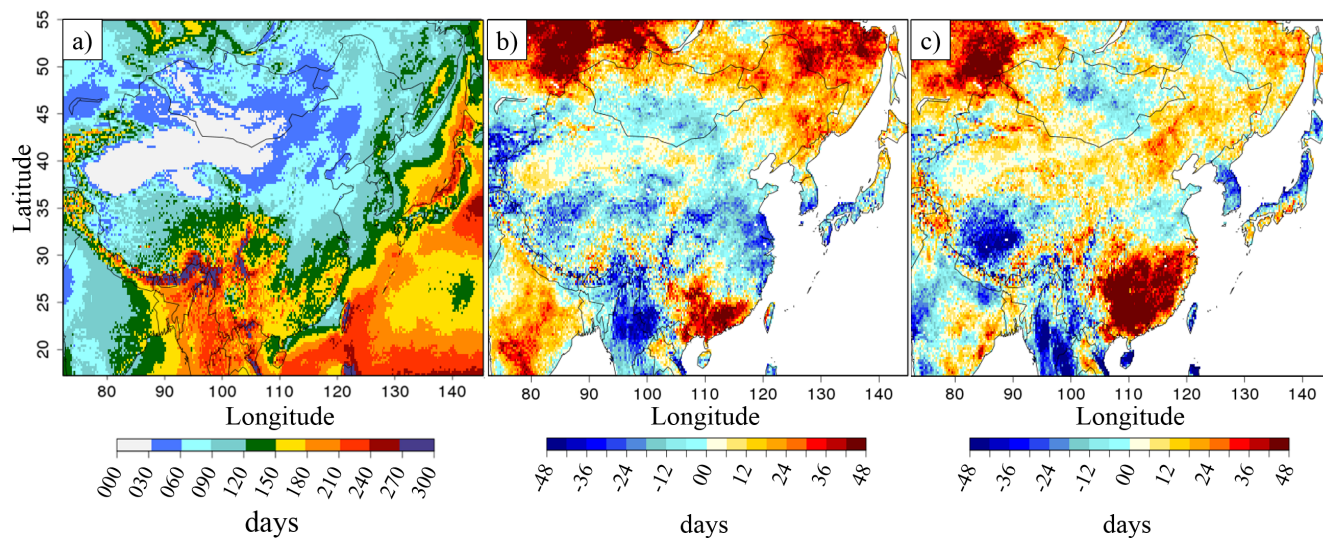


**Figure S4.** NO<sub>2</sub> columns evolution from OMI satellite, from 2008 to 2016, in molecules.cm<sup>-2</sup>.

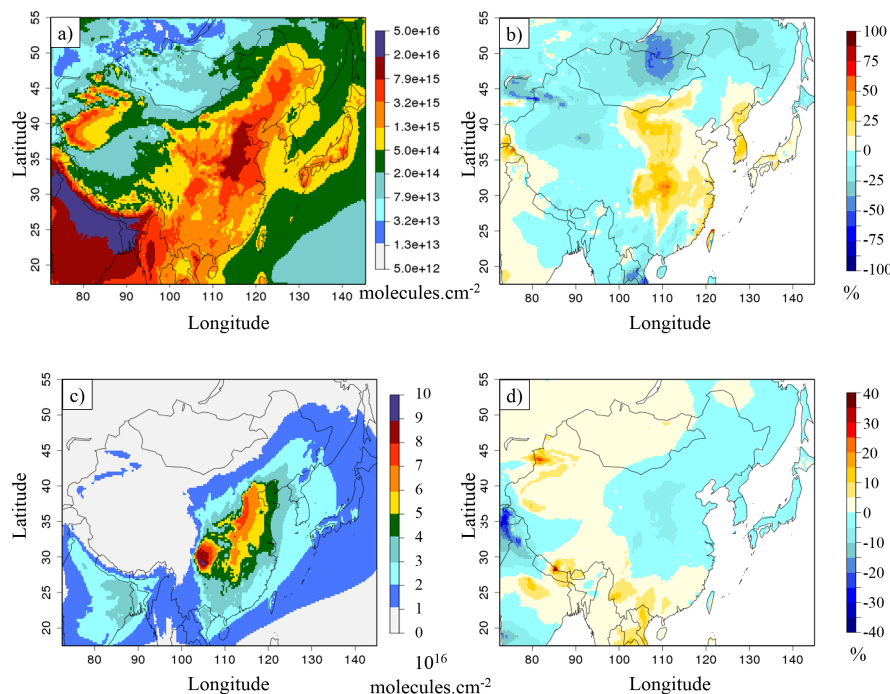




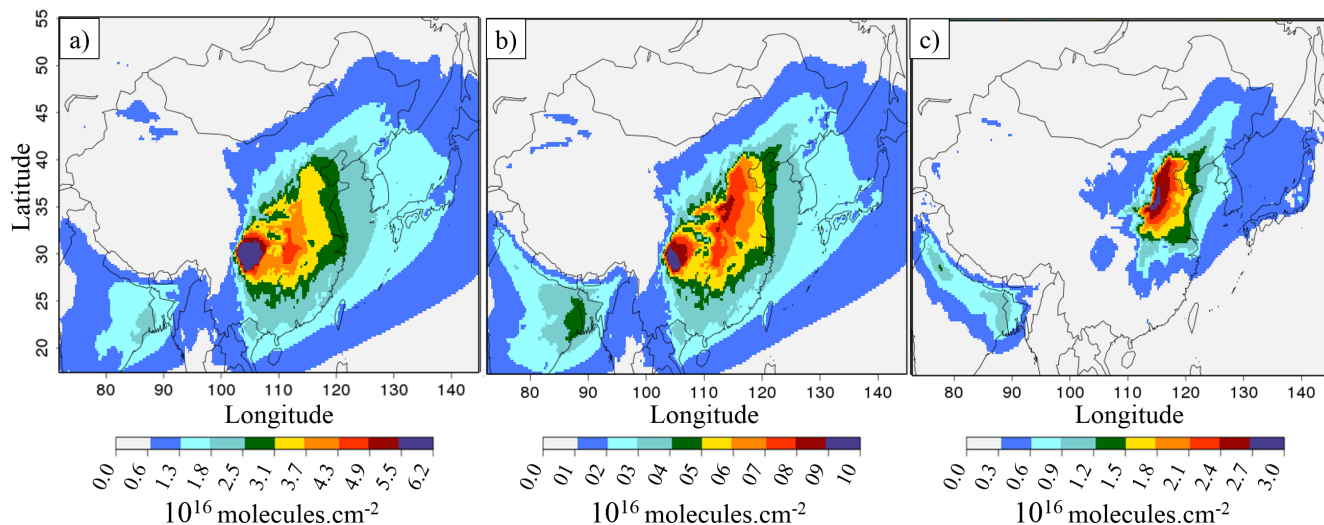
**Figure S5.** a) Annual mean temperature for 2011, b) annual mean temperature differences (2013-2011), c) annual mean temperature differences (2015-2011), d) annual mean RH for 2011, e) annual mean RH differences (2013-2011), f) annual mean RH differences (2015-2011).



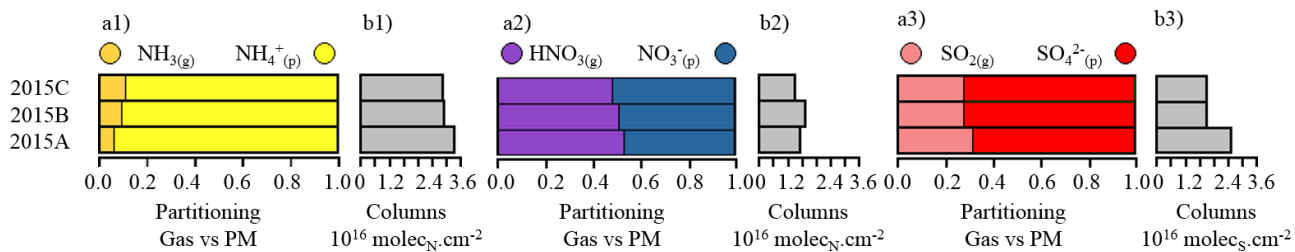
**Figure S6.** a) Annual rainfall frequencies ( $\text{Rainfall} > 1\text{mm}\cdot\text{day}^{-1}$ ) for 2011, b) annual rainfall frequencies differences (2013-2011), c) annual rainfall frequencies differences (2015-2011).



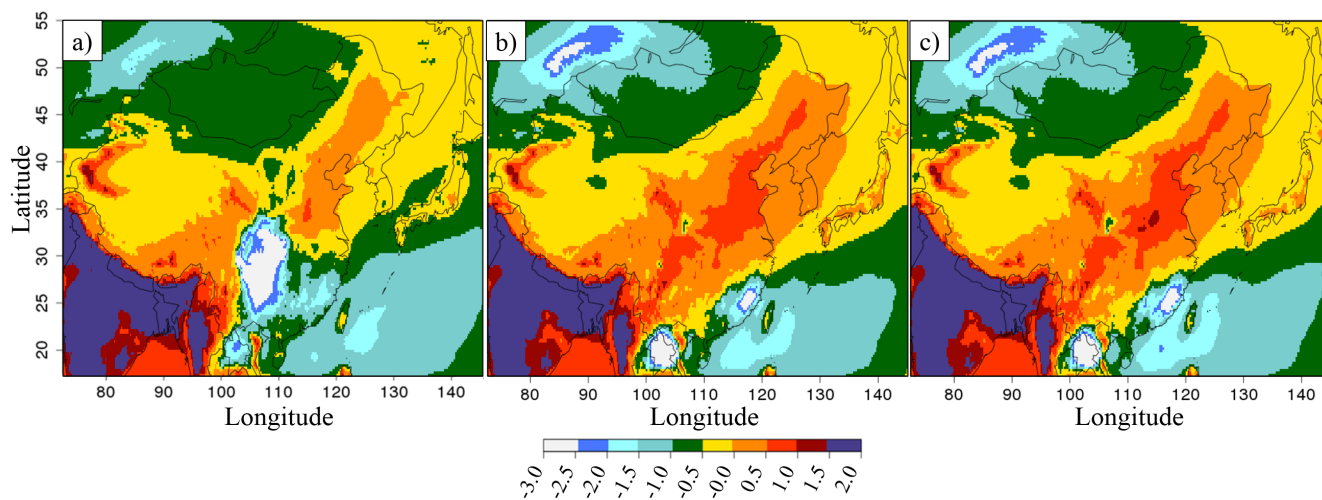
**Figure S7.** a) Ammonia columns in  $\text{molecules.cm}^{-2}$  for the simulation 2013A, b) relative differences of ammonium columns between the simulations from 2013C and 2013A, in % c) ammonium columns in  $\text{molecules.cm}^{-2}$  for the simulation 2013A and d) relative differences of ammonium columns between the simulations from 2013C and 201CA, in %.



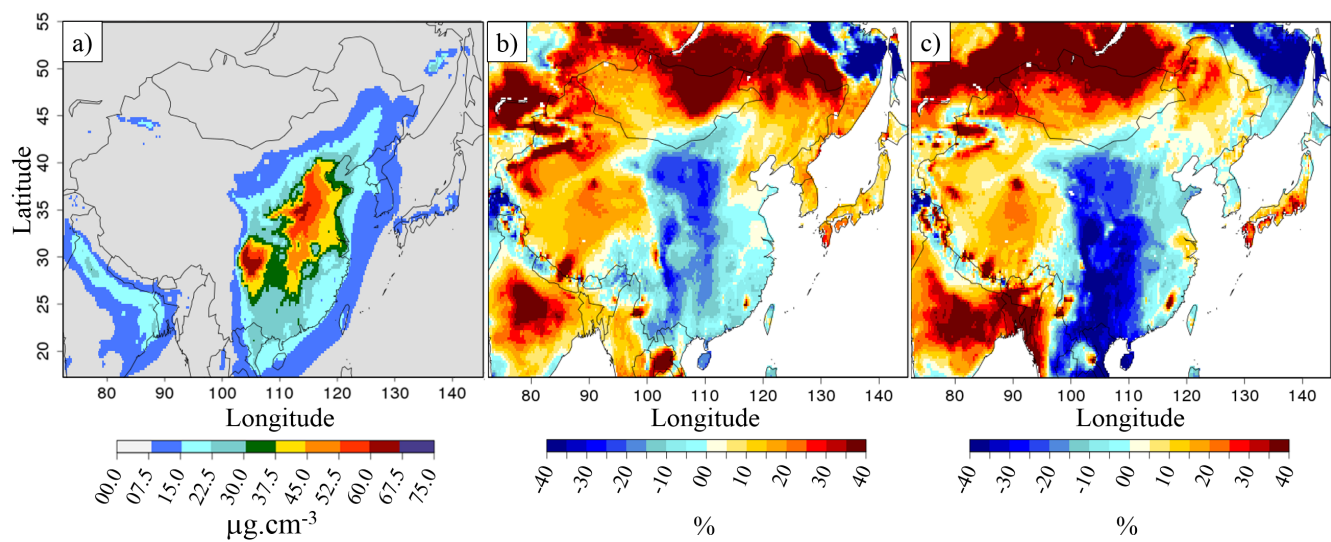
**Figure S8.** a) 2015A annual mean  $\text{SO}_{4(\text{p})}^{2-}$  columns, b) 2015A annual mean  $\text{NH}_{4(\text{p})}^{+}$  columns, c) 2015A annual mean  $\text{NO}_{3(\text{p})}^{-}$  columns. Units in  $\text{molecules.cm}^{-2}$ .



**Figure S9.** a) Molar partitioning between gas and the particulate phases over East China b) column means over East China in  $10^{-9}$  molecules. $\text{cm}^{-2}$ . 1) TA, 2) TN, 3) TS.



**Figure S10.** a) Annual  $G_{\text{ratio}}$  mean for 2015A, b) annual  $G_{\text{ratio}}$  mean for 2015B, c) annual  $G_{\text{ratio}}$  mean for 2015C.



**Figure S11.** a) PM<sub>2.5</sub>(pSNA) columns in  $\mu\text{g}\cdot\text{cm}^{-2}$  for 2011A b) relative differences of PM<sub>2.5</sub>(pSNA) columns between 2013C and 2011A, in % and c) relative differences of PM<sub>2.5</sub>(pSNA) columns between 2015C and 2011A, in %.