Supplementary material published together with the article "Implementation of dust emission and chemistry into the Community Multiscale Air Quality modeling system and initial application to an Asian dust storm episode"

K. Wang[1], Y. Zhang[1, 2], A. Nenes[3, 4, 5], and C. Fountoukis[5]

[1]*Department of Marine, Earth, and Atmospheric Sciences, North Carolina State University, Campus Box 8208, Raleigh, NC 27695, USA*

[2]*School of Environment, Tsinghua University, Beijing, China*

[3]*Schools of Earth and Atmospheric Sciences, Georgia Institute of Technology, Atlanta, GA 30332, USA*

[4]*Schools of Chemical and Biomolecular Engineering, Georgia Institute of Technology, Atlanta, GA 30332, USA*

[5]*Institute of Chemical Engineering and High Temperature Chemical Processes (ICE-HT), Foundation for Research and Technology Hellas (FORTH), Patras, 26504, Greece*

Correspondence to: Y. Zhang (yzhang9@ncsu.edu)

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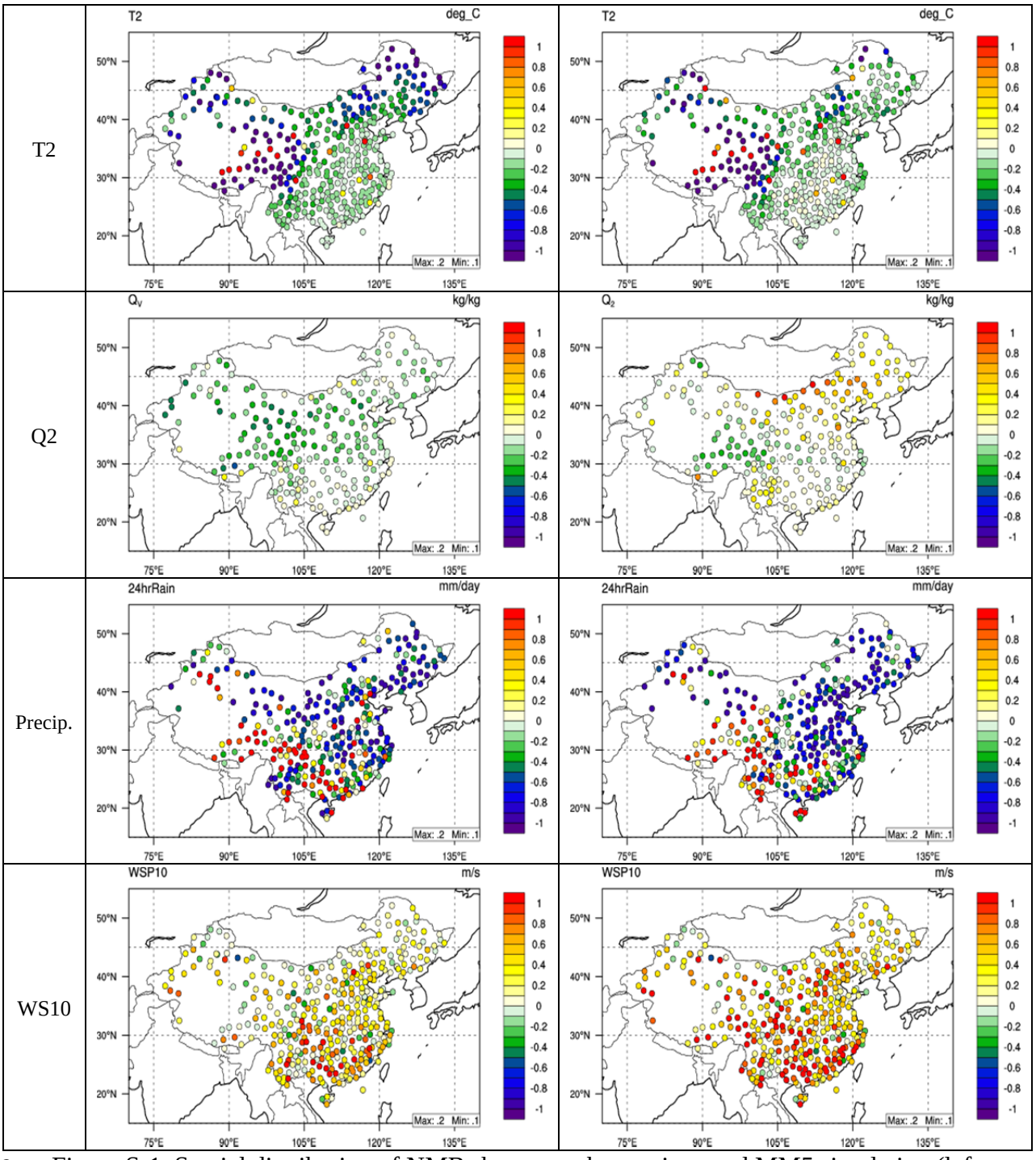


2 Figure S-1. Spatial distribution of NMBs between observations and MM5 simulation (left
3 panel) and WRF simulation (right panel) for temperature at 2 m (T2), water vapor mixing
4 ratio at 2 m (Q2), 24 h total precipitation (Precip.), and wind speed at 10 m (WS10) over
5 China for April 2001.

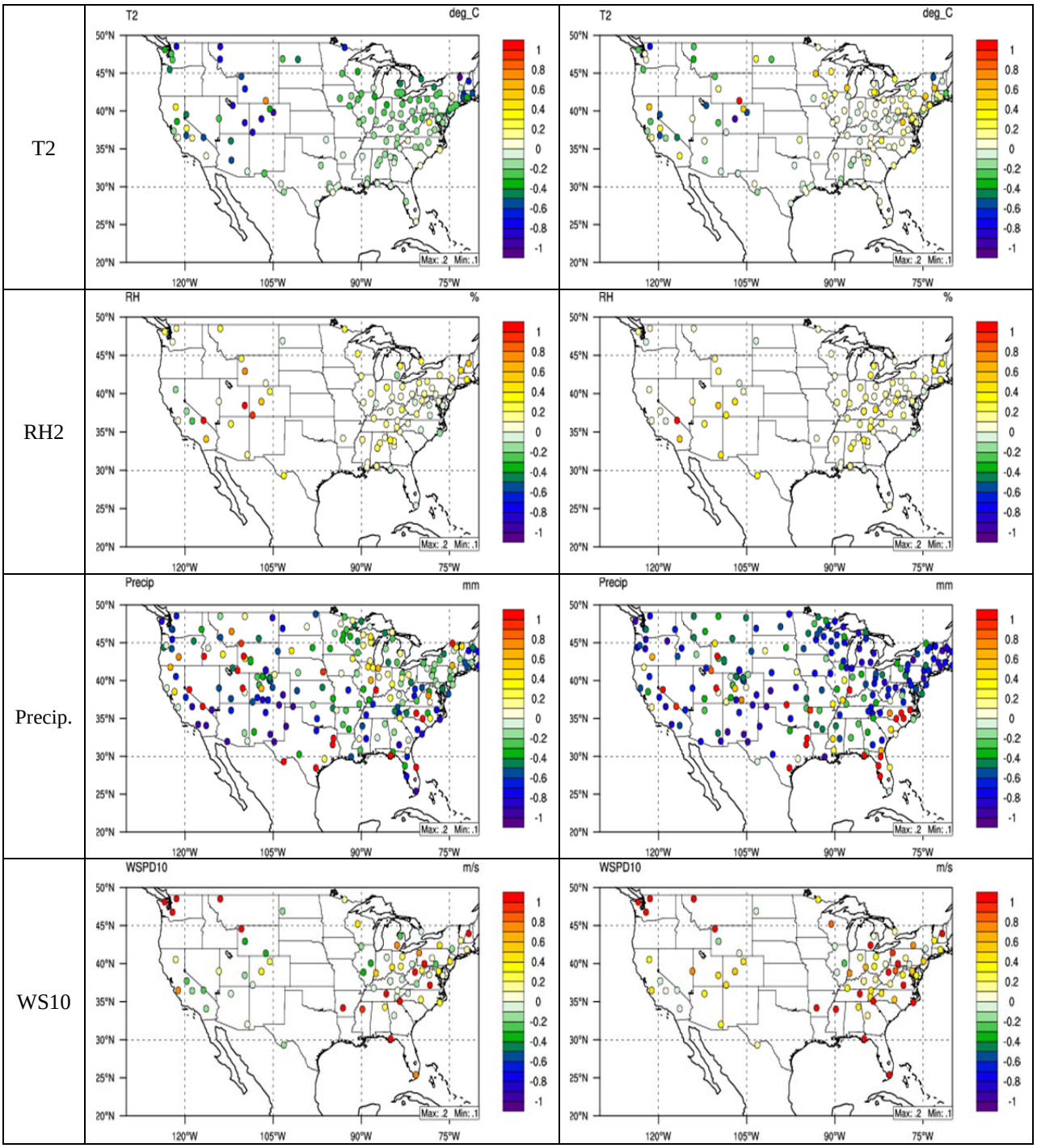


Figure S-2. Spatial distribution of NMBs between observations and MM5 simulation (left panel) and WRF simulation (right panel) for temperature at 2 m (T2), relative humidity at 2 m (RH2), weekly total precipitation (Precip.), and wind speed at 10 m (WS10) over the U.S. for April 2001.

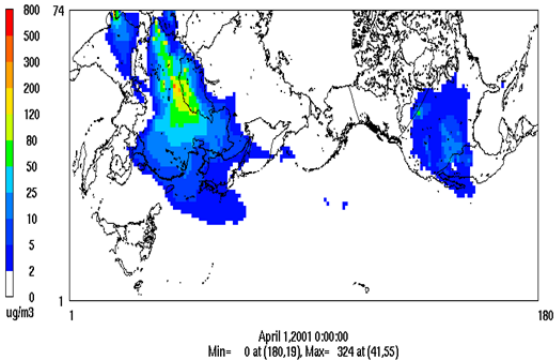
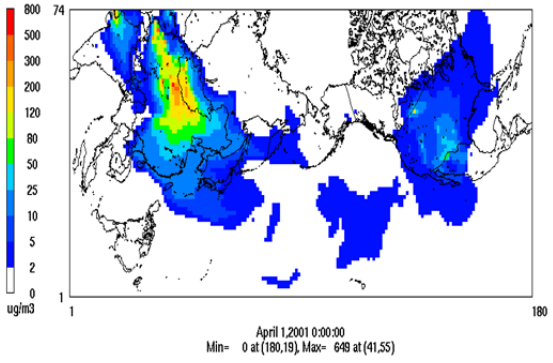
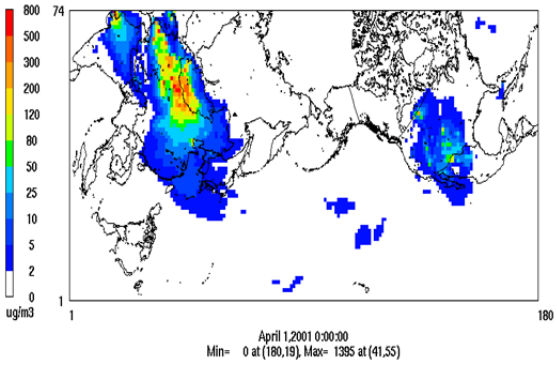
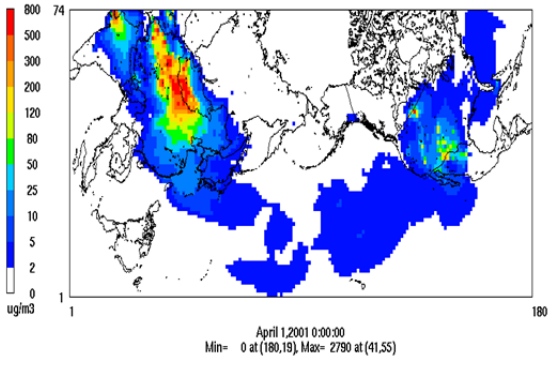
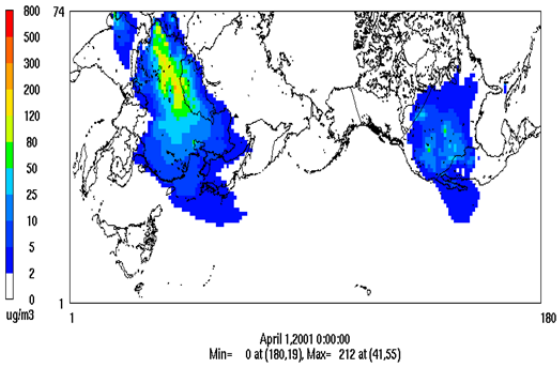
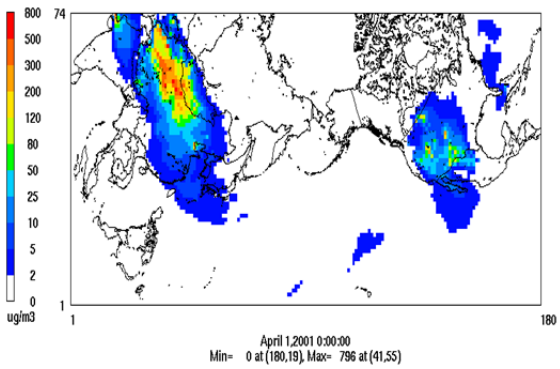
(a) Fine-mode dust concentration at surface with E_F of 0.5 from the Zender scheme	(b) Fine-mode dust concentration at surface with E_F of 1.0 from the Zender scheme
	
(c) Coarse-mode dust concentration at surface with E_F of 0.5 from the Zender scheme	(d) Coarse-mode dust concentration at surface with E_F of 1.0 from the Zender scheme
	
(e) Fine-mode dust concentration at surface with E_F of 0.5 from the Westphal scheme	(f) Coarse-mode dust concentration at surface with E_F of 0.5 from the Westphal scheme
	

Figure S-3. The predicted monthly-mean (a)-(b) fine-mode dust and (c)-(d) coarse-mode dust concentrations with E_F of 0.5 and 1.0 from the Zender scheme and (e)-(f) fine-mode and coarse-mode dust with E_F of 0.5 from the Westphal scheme at surface in CMAQ-Dust.

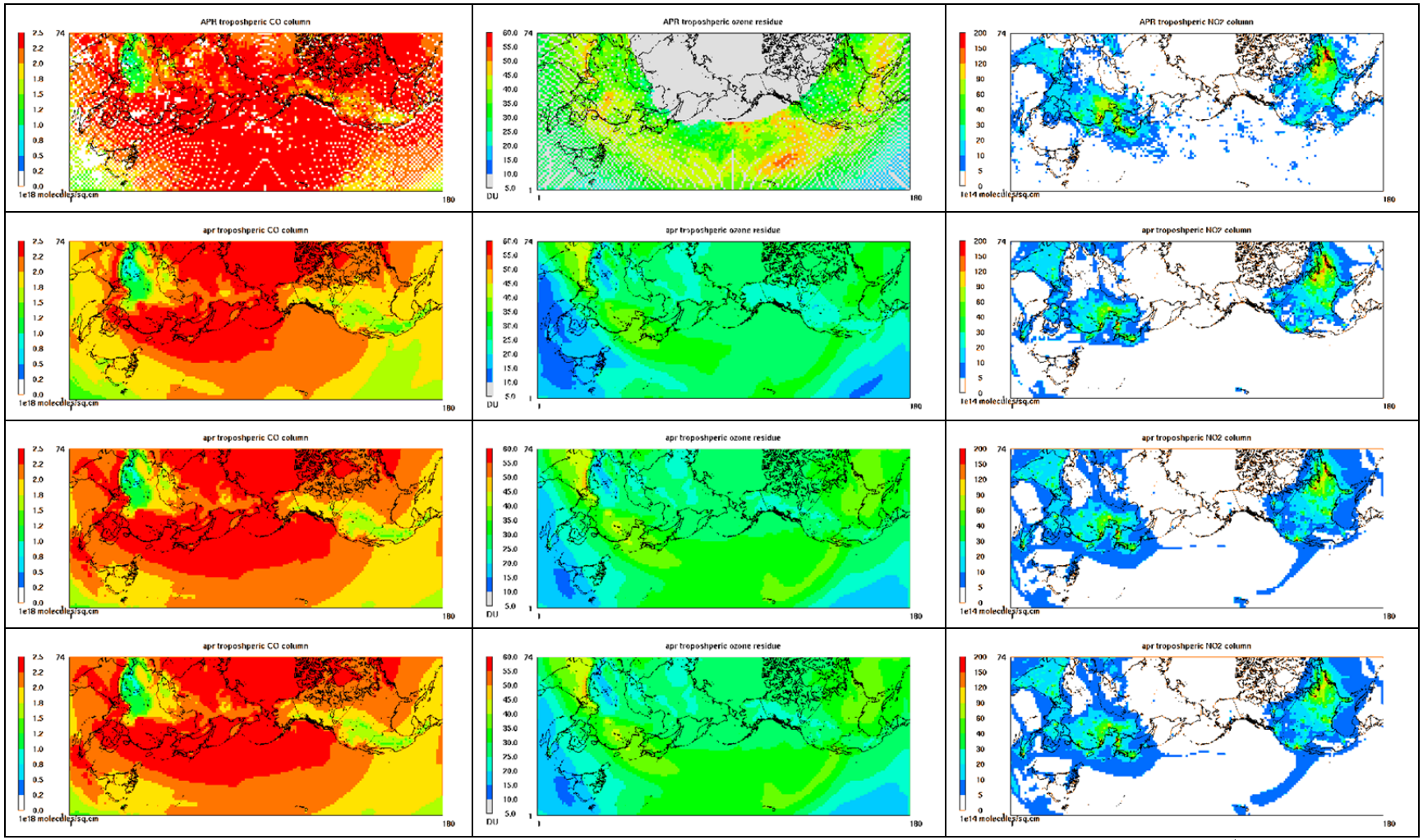


Figure S-4. Spatial distribution of column variables (from left to right: CO, TOR, NO_2) from satellite observations (1st row), CMAQ v4.4 (2nd row), DEFAULT CMAQ v4.7 simulation (3rd row) and DUST simulation (4th row) in April 2001.

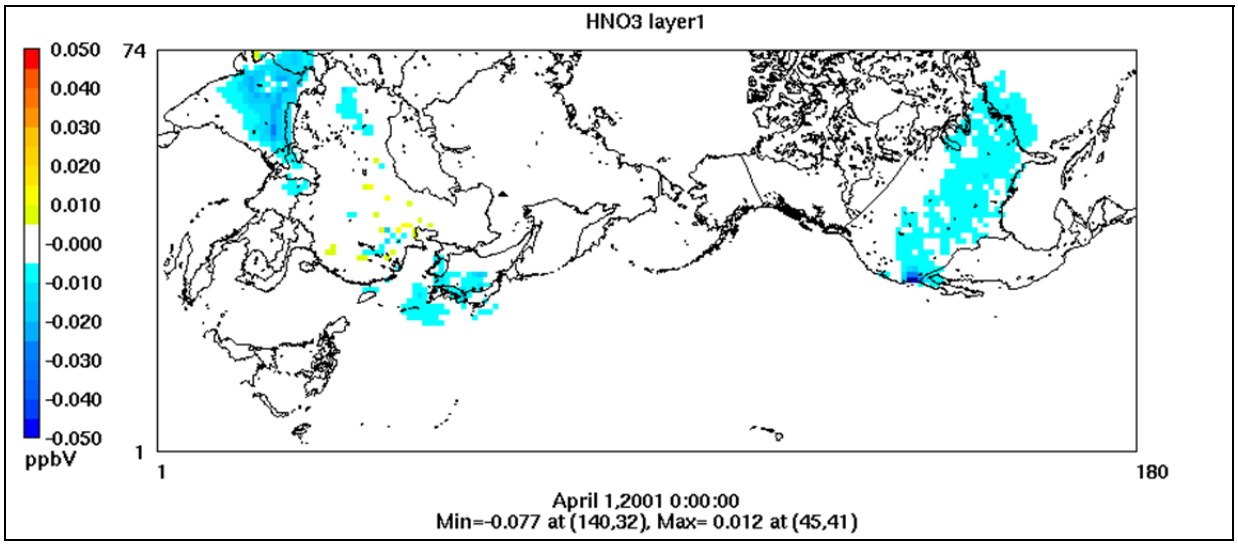


Figure S-5 Spatial distribution of differences between simulations DUST and CRUST_ONLY for surface layer HNO_3 in April 2001

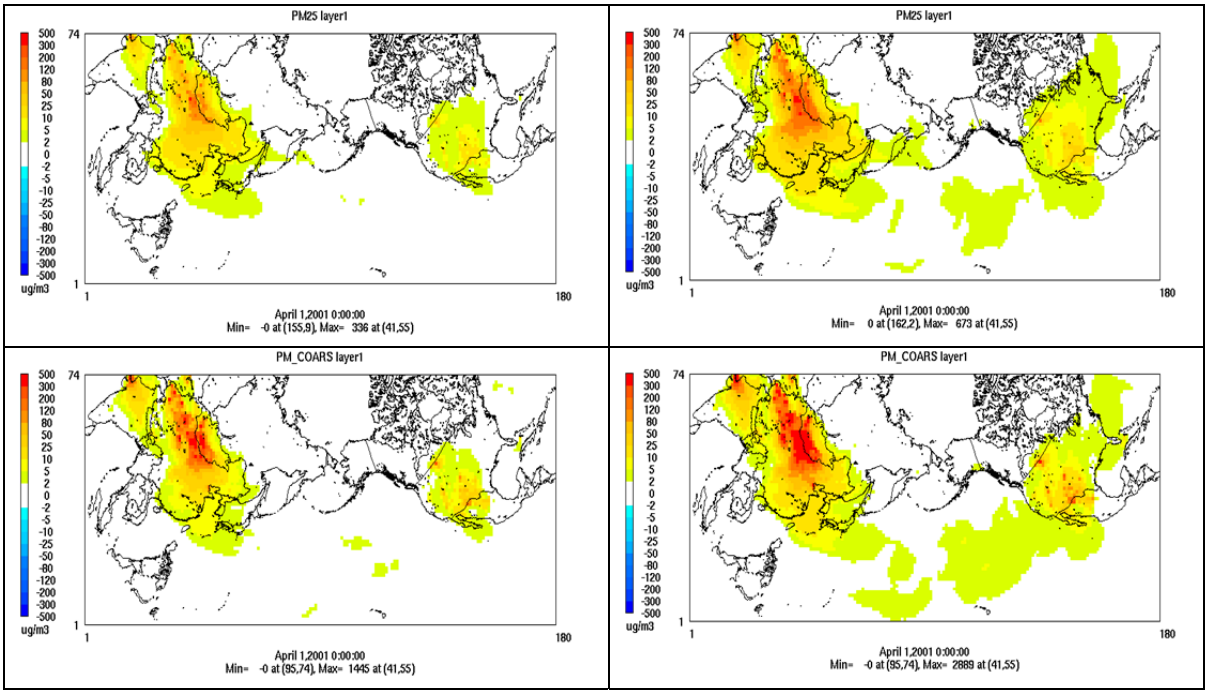


Figure S-6. Spatial distribution of differences between simulations DUST and BASELINE_NO_DUST (left panel) and between simulations DUST_HIGH_EF and BASELINE_NO_DUST (right panel) at surface layer for $PM_{2.5}$ and PM_{coarse} in April 2001.

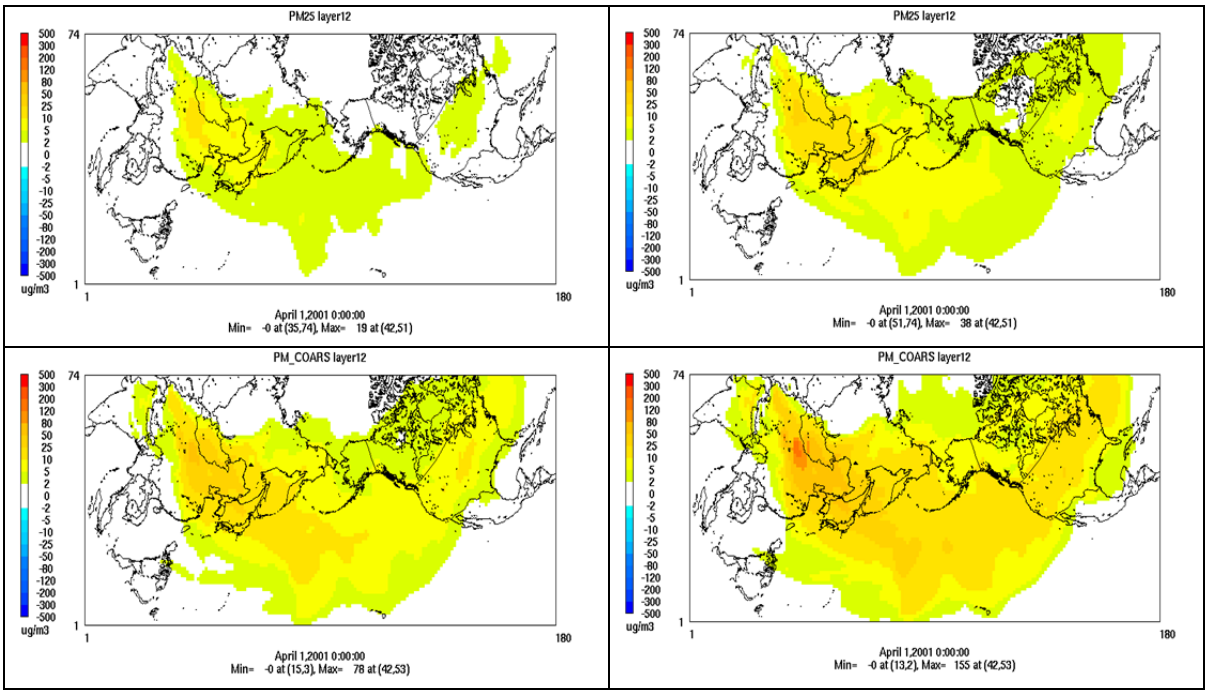


Figure S-7. Spatial distribution of differences between simulations DUST and BASELINE_NO_DUST (left panel) and between simulations DUST_HIGH_EF and BASELINE_NO_DUST (right panel) at an altitude of ~5-km for $PM_{2.5}$ and PM_{coarse} in April 2001.