



Supplement of

Potential impact of a US climate policy and air quality regulations on future air quality and climate change

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- 1 Table S1. US mean concentrations of air pollutants in the baseline (bs05) simulation.
 2 All PM has a unit of $\mu\text{g m}^{-3}$, and gases have a unit of ppb.

Species	OMA	TOMAS
PM2.5 [$\mu\text{g m}^{-3}$]	8.5	6.4
SO ₄	1.2	1.9
BC	0.2	0.3
OC	1.3	1.2
NO ₃	1.4	0.0
SS	4.1	2.2
DU	0.3	0.8
NO _x [ppb]	3.2	3.0
O ₃ [ppb]	57.2	58.9
CO [ppb]	174.0	166.7

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1 Table S2. Changes in US mean air pollution due to the current AQ regulations and
 2 CO₂ reduction policy in ModelE2-OMA (averaged over the 50 U.S states). All PM has
 3 a unit of $\mu\text{g m}^{-3}$, and gases have a unit of ppb. O₃ and CO are multiplied by 0.1.

ModelE2-OMA	CO ₂ 30	CO ₂ NQ30	AQ30	BOTH30	CO ₂ 55	CO ₂ NQ55	AQ55	BOTH55
SO ₄	-0.11	-0.33	-0.51	-0.62	-0.14	-0.52	-0.54	-0.68
EC	0.02	0.02	-0.12	-0.11	0.01	0.01	-0.15	-0.14
OM	0.01	0.01	-0.34	-0.33	-0.05	-0.10	-0.41	-0.45
NO ₃	-0.05	-0.05	-0.76	-0.81	-0.16	-0.21	-0.84	-1.00
PM2.5	-0.13	-0.36	-1.74	-1.87	-0.34	-0.82	-1.92	-2.27
NO _x	0.08	0.03	-1.94	-1.85	-0.05	-0.41	-2.18	-2.23
O ₃ [x0.1]	0.07	0.06	-0.83	-0.77	0.00	-0.11	-0.87	-0.86
CO [x0.1]	0.02	-0.01	-1.86	-1.84	-0.35	-1.25	-2.18	-2.53

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6 Table S3. Same as the S-Table 2 but with ModelE2-TOMAS.

ModelE2- TOMAS	CO ₂ 30	CO ₂ NQ30	AQ30	BOTH30	CO ₂ 55	CO ₂ NQ55	AQ55	BOTH55
SO ₄	-0.15	-0.46	-0.73	-0.88	-0.20	-0.73	-0.77	-0.97
EC	0.02	0.02	-0.14	-0.13	0.01	0.01	-0.17	-0.16
OM	-0.01	-0.01	-0.06	-0.07	-0.05	-0.05	-0.08	-0.13
PM2.5	-0.14	-0.46	-0.94	-1.08	-0.25	-0.77	-1.02	-1.27
NO _x	0.08	0.03	-1.86	-1.78	-0.04	-0.40	-2.09	-2.13
O ₃ [x0.1]	0.08	0.07	-0.94	-0.86	0.01	-0.12	-1.00	-0.99
CO [x0.1]	0.03	-0.01	-2.04	-2.02	-0.34	-1.26	-2.38	-2.72

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1 Table S4. Global mortality changes for ModelE2-OMA

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ModelE2-OMA	CO ₂ 30	CO ₂ NQ30	AQ30	BOTH30	CO ₂ 55	CO ₂ NQ55	AQ55	BOTH55
<i>CRF_{low,pm}</i>	1530	3460	16290	17820	4800	7800	17600	22400
<i>CRF_{base,pm}</i>	6300	20200	83800	90100	21000	42000	91000	112000
<i>CRF_{high,pm}</i>	22600	37000	195200	217800	70000	89000	213000	283000
<i>CRF_{low,O3}</i>	-1626	-1690	19080	17454	-20	2990	20900	20880
<i>CRF_{base,O3}</i>	-2590	-2250	29950	27360	-30	5050	35470	35440

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1 Table S5. Global mean RF summary for ModelE2-OMA

ModelE2-OMA	CO ₂ 30	CO ₂ NQ30	AQ30	BOTH30	CO ₂ 55	CO ₂ NQ55	AQ55	BOTH55
ADF	0.004	0.011	0.023	0.027	0.007	0.018	0.023	0.030
SO ₄	0.005	0.014	0.023	0.027	0.007	0.023	0.025	0.031
EC	0.001	0.001	-0.006	-0.005	0.000	0.000	-0.007	-0.007
OC	0.000	0.000	0.002	0.007	0.000	0.001	0.003	0.003
SS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
DU	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000
NO ₃	-0.001	-0.004	0.004	0.003	-0.001	-0.006	0.003	0.003
BCalb	0.000	0.000	-0.001	-0.001	0.000	0.000	-0.002	-0.002
AIF	0.0044	0.011	0.029	0.033	0.009	0.020	0.032	0.041
O ₃	0.0006	0.000	-0.015	-0.014	-0.001	-0.004	-0.016	-0.017
CO ₂	-0.0240	-0.024	0.000	-0.024	-0.070	-0.070	0.000	-0.070
CH ₄	-0.0012	-0.004	0.010	0.009	-0.001	-0.006	0.009	0.008
Total	-0.0158	-0.007	0.045	0.030	-0.057	-0.042	0.047	-0.010

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3 Table S6. US mean RF summary for ModelE2-OMA

ModelE2-OMA	CO ₂ 30	CO ₂ NQ30	AQ30	BOTH30	CO ₂ 55	CO ₂ NQ55	AQ55	BOTH55
ADF	0.099	0.17	0.55	0.65	0.18	0.33	0.56	0.74
SO ₄	0.090	0.26	0.45	0.51	0.12	0.42	0.45	0.57
EC	0.015	0.015	-0.12	-0.106	0.007	0.009	-0.14	-0.14
OC	-0.002	-0.002	0.052	0.050	0.005	0.013	0.062	0.068
SS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
DU	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO ₃	-0.004	-0.104	0.201	0.196	0.043	-0.120	0.193	0.236
BCalb	0.003	0.002	-0.032	-0.029	0.000	0.000	-0.036	-0.036
AIF	0.06	0.09	0.38	0.44	0.12	0.17	0.37	0.49
O ₃	0.00	0.00	-0.07	-0.07	0.00	-0.01	-0.07	-0.08
CO ₂	-0.02	-0.02	0.00	-0.02	-0.07	-0.07	0.00	-0.07
CH ₄	0.00	-0.01	0.00	0.01	0.00	-0.01	0.00	0.00
Total	0.14	0.23	0.83	0.99	0.22	0.41	0.82	1.05

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1 Table S7. Global mean RF summary for ModelE2-TOMAS

ModelE2-OMA	CO ₂ 30	CO ₂ NQ30	AQ30	BOTH30	CO ₂ 55	CO ₂ NQ55	AQ55	BOTH55
ADF	0.005	0.014	0.011	0.016	0.005	0.020	0.010	0.015
SO ₄	0.003	0.011	0.017	0.020	0.004	0.016	0.017	0.021
EC	0.002	0.003	-0.006	-0.004	0.001	0.004	-0.007	-0.006
OC	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.001
SS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
DU	0.000	0.000	0.000	0.000	0.000	-0.001	-0.001	-0.001
NO ₃								
BCalb	0.000	0.000	-0.002	-0.002	0.000	0.000	-0.003	-0.003
AIF	0.004	0.008	0.016	0.021	0.008	0.017	0.021	0.029
O ₃	0.001	0.000	-0.015	-0.014	-0.001	-0.004	-0.016	-0.017
CO ₂	-0.024	-0.024	0.000	-0.024	-0.070	-0.070	0.000	-0.070
CH ₄	-0.001	-0.004	0.010	0.009	-0.001	-0.006	0.009	0.008
Total	-0.015	-0.007	0.020	0.005	-0.059	-0.043	0.021	-0.038

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4 Table S8. US mean RF summary for ModelE2-TOMAS

ModelE2-OMA	CO ₂ 30	CO ₂ NQ30	AQ30	BOTH30	CO ₂ 55	CO ₂ NQ55	AQ55	BOTH55
ADF	0.05	0.15	0.14	0.19	0.06	0.23	0.14	0.20
SO ₄	0.04	0.13	0.20	0.24	0.05	0.20	0.21	0.26
EC	0.01	0.02	-0.08	-0.06	0.01	0.02	-0.09	-0.08
OC	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02
SS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO ₃	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BCalb	0.00	0.00	-0.04	-0.03	0.00	0.00	-0.04	-0.04
AIF	0.08	0.12	0.25	0.34	0.14	0.22	0.27	0.41
O ₃	0.00	0.00	-0.07	-0.07	0.00	-0.01	-0.08	-0.08
CO ₂	-0.02	-0.02	0.00	-0.02	-0.07	-0.07	0.00	-0.07
CH ₄	0.00	-0.01	0.00	0.01	0.00	-0.01	0.00	0.00
Total	0.12	0.24	0.28	0.40	0.14	0.35	0.29	0.43

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