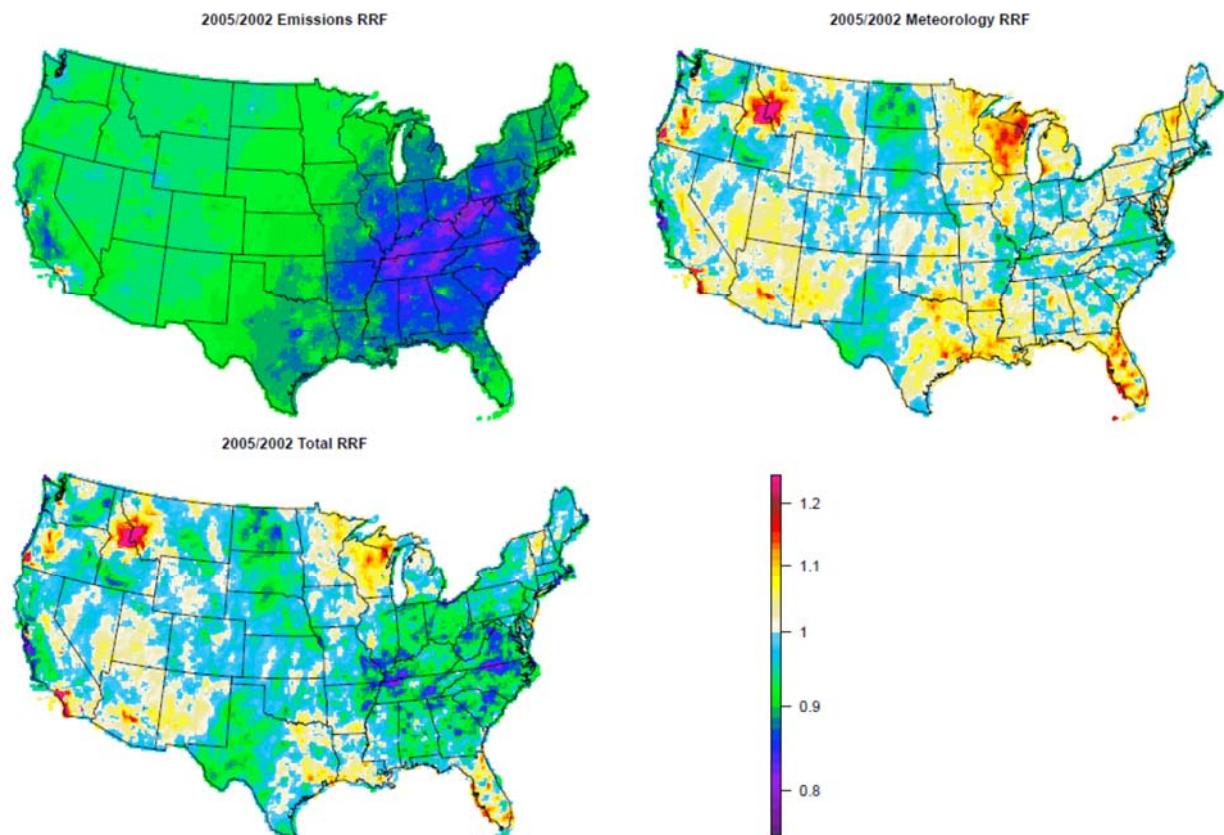


Supplemental Material

Figure S1. Top10 RRF values for the entire US domain. The top left figure is based on the ratio of Sim05e02m output to Sim02e02m output, representing the RRFs used in the attainment evaluation in this paper. The top right figure shows the ratio of Sim02e05m output to Sim02e02m. This figure represents the model-predicted change in ozone due to changes in meteorology across these two years under 2002 emission levels. The final figure on the bottom row is a “total” RRF based on the ratio of Sim05e05m to Sim02e02m output and shows the model predicted change in ozone levels from 2002 to 2005 due to changes in both emissions and meteorology.



S2. Creation of hourly emissions for point sources without CEMS data (ptipm)

Pseudo-CEMS data were created for point sources that only have annual total emissions available in the NEI. For Sim02e02m, state-specific month-to-annual ratios were created by calculating three-year averages of 2001-2003 CEMS data for each month and dividing these monthly averages by the three year annual average for the state. The annual total ptipm emissions for each unit were then allocated to month totals using these state-specific monthly ratios. To allocate the monthly emissions to each day, state-specific day-to-month ratios were calculated using daily 2005 CEMS data divided by the monthly average for 2005. These state-specific day-to-month factors were then multiplied by the monthly total emissions for a given unit to calculate the total emissions on each day for that unit. The resulting daily emissions were input into the SMOKE processing system and hourly-to-daily allocation was performed using diurnal profiles. An analogous calculation was made to estimate hourly 2005 emissions for the Sim05e05m simulation based on 2004-2006 CEMS data. This is the standard method used in regulatory applications for creating simulations based on future emissions levels under current, base line meteorological conditions. Emissions inputs for Sim02e05m used 2002 ptipm unit annual total emissions scaled with 2001-2003 annual-to-month ratios to preserve the NO_x SIP call seasonal distribution and 2005 day-to-month ratios to preserve the meteorological patterns of the meteorological year. Emissions inputs for Sim05e02m used 2005 ptipm unit annual total emissions scaled with 2004-2006 annual-to-month ratios and 2002 day-to-month ratios.

Table S1. Evaluation of different approaches for predicting the observed 2005 DVs at 388 AQS sites within NOx SIP Call States. The evaluation statistics include mean bias (MB), root mean square error (RMSE), R^2 , and accuracy for predicting attainment for the 75ppb and 84ppb NAAQS.

	MB (ppb)	RMSE (ppb)	R^2	Accuracy for 75ppb	Accuracy for 84ppb
Future Model	4.8	8.1	.35	.70	.80
TH85 RRF	4.6	6.4	.60	.78	.79
TH76 RRF	5.0	6.8	.59	.77	.77
TH71 RRF	5.1	6.8	.61	.77	.78
Top10 RRF	4.6	6.4	.60	.78	.79
Top20 RRF	4.9	6.6	.60	.77	.78

Table S2. Evaluation of different approaches for predicting the observed 2005 DVs at 231 AQS sites that are not within NOx SIP Call States. The evaluation statistics include mean bias (MB), root mean square error (RMSE), R^2 , and accuracy for predicting attainment for the 75ppb and 84ppb NAAQS.

	MB (ppb)	RMSE (ppb)	R^2	Accuracy for 75ppb	Accuracy for 84ppb
Future Model	3.0	9.3	.37	.77	.71
TH85 RRF	2.5	7.0	.71	.79	.86
TH76 RRF	2.7	7.1	.71	.79	.85
TH71 RRF	2.7	7.1	.71	.79	.85
Top10 RRF	2.5	6.9	.71	.79	.86
Top20 RRF	2.6	7.0	.71	.79	.85

Figure S3. Observed 2002 and 2005 design values (top row) in the eastern US. The remaining plots show model predicted 2005 DVs in a categorical sense based on output from Sim05e02m (left column) and the TH85 RRF based approach (right column) for both the 84 ppb standard (middle row) and the 75 ppb standard (bottom row). Four categories are depicted: true exceedance (green circle); false exceedance (purple triangle); false attainment (red inverted triangle); true attainment (yellow square).

