

Responses to the reviewer's comments on Li Li's manuscript

Referee 1:

1. How many vertical layers used in MM5 and CMAQ? In the paper, line 19-20 on page 15054 “Both the MM5 and CMAQ employ 14 vertical layers of varying thickness with denser layers in the lower atmosphere to better resolve the mixing height”. What are the detailed 14 vertical layers?

Answer: For the detailed 14 vertical layers, we use δ height, as follows:

VGTOP3D=5000
VGLVS3D(1)=1
VGLVS3D(2)=0.995
VGLVS3D(3)=0.988
VGLVS3D(4)=0.980
VGLVS3D(5)=0.97
VGLVS3D(6)=0.956
VGLVS3D(7)=0.938
VGLVS3D(8)=0.893
VGLVS3D(9)=0.839
VGLVS3D(10)=0.777
VGLVS3D(11)=0.702
VGLVS3D(12)=0.582
VGLVS3D(13)=0.4
VGLVS3D(14)=0.2
VGLVS3D(15)=0

2. In Table 1, the unit of relative humidity, may change to water mixing ratio.

Answer: The unit of relative humidity has been changed to water mixing ratio.

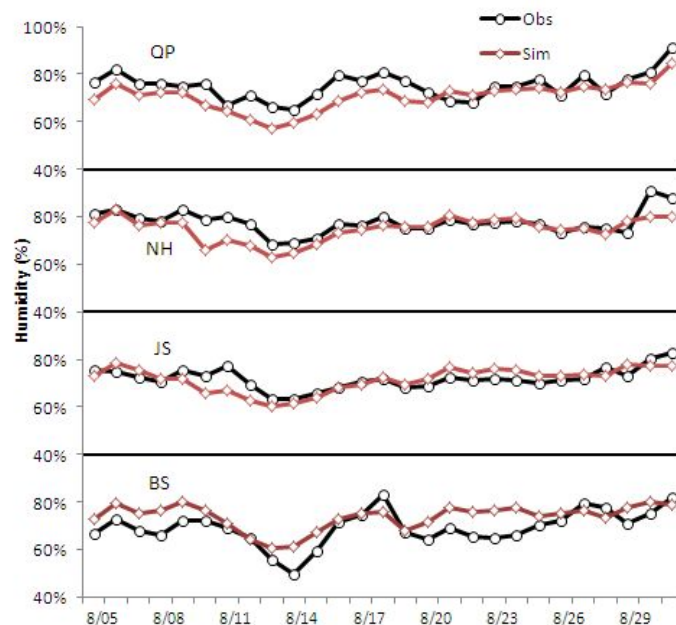
Table 1 Statistical results between MM5 model and observation data at surface stations in Shanghai

		BS	JS	NH	QP	Average
Wind Speed	RMSE(m/s)	1.76	1.43	1.13	1.24	1.39
	Bias(m/s)	0.94	0.57	0.43	0.65	0.65
	IOA	0.4	0.44	0.57	0.51	0.48
Wind Direction	Gross Error(deg.)	38.02	30.88	29.43	39.79	34.53
	Bias(deg.)	3.21	4.55	-2.83	5.05	2.50
Temperature	Gross Error(K)	0.82	1.18	1.55	1.21	1.19

	Bias(K)	-0.91	-0.71	1.36	0.77	0.13
	IOA	0.76	0.81	0.83	0.90	0.83
Relative Humidity	Gross Error(%)	5.77%	3.35%	3.81%	5.14%	4.52%
	Bias(%)	4.41%	-0.33%	-2.77%	-4.41%	-0.78%
	IOA	0.96	0.97	0.96	0.96	0.96

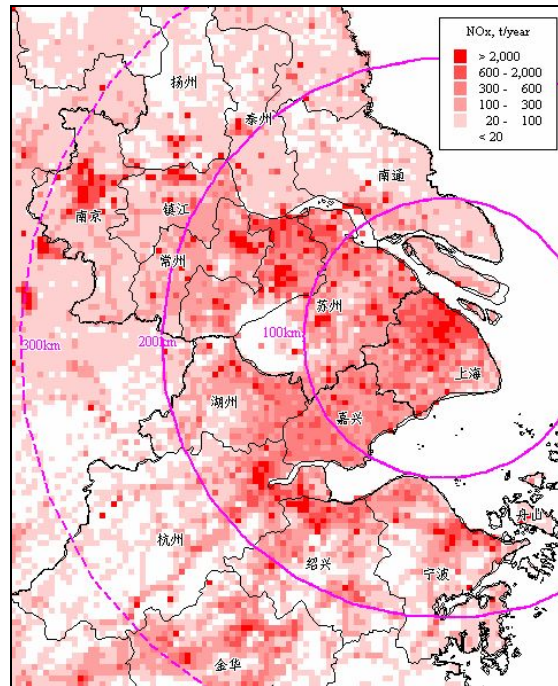
3. Figure 3 on page 15075, the humidity values are around 20g/kg, are they correct? Also, in the tile of this figure, the relative humidity is not suitable.

Answer: We have changed the humidity from g/kg to water mixing ratio (%).



4. How about the distribution of emissions of NO_x over YRD used in CMAQ model?

Answer: The distribution of emissions of NO_x over YRD used in the CMAQ is shown in the following figure, which has been combined in the gridded emission inventory based on temporal profiles.



5. There are no vertical O_3 observations to compare with the simulations, if the vertical simulation results were compared with the measurements, it will be better to use process analysis method to understand the different layer results.

Answer: This is a very good suggestion. The authors are also quite confused about the real measurements of vertical O_3 concentrations. Since we are lack of the vertical O_3 observations in the YRD, we will try to include this part in the future study.