

Figure 1: The pressure-time plot of the error of the temperature (the error = modeled - observed)

Table 1: The monthly mean of the temperature error in different vertical layers

Press.(hPa)	1000	925	850	700	500	400	300	200	100
Err.	0.8	-0.2	-0.5	-0.4	-0.7	-0.4	-0.3	0.2	10.9

Model validation at the upper layer

The observation from the tower station of the Institute of Atmospheric Physics, Chinese Academy of Sciences (IAP) was used to evaluate the model performance of the meteorological model. The station locates at the north of the urban Beijing with meteorological tower height of 325m, and air pollutant measurements setup at 47m, 120m and 280m height which have been specified as vertical Layer-1(47m), Layer-2(120m) and Layer-3(280m) in our manuscript.

Thus, the vertical profiles of the modeled meteorological results at the upper layer have been validated with the atmospheric soundings data and added in supplement of the revised paper. The observation of the atmospheric soundings data was obtained from <http://weather.uwyo.edu/upperair/sounding.html> with the Station Number of 54511 located at the south of urban Beijing and 9 km away from the IAP tower station. The observation period is at 00 and 12 am GMT, daily.

Model evaluation is showed on Figure 1 ~ Figure 4 (Temperature, relative humidity, wind and pressure,). As perceptible on Figure 1, the error of the temperature was less than 2 °C in the vertical layer below the 200 hPa over August, 2006 with reasonable modeling results.

Figure 2 shows the modeled pressure layers compared against observed data. The modeled results in different pressure layers match well with the observed. The 1.1km layer discussed in the manuscript is comprised between the 850 hPa

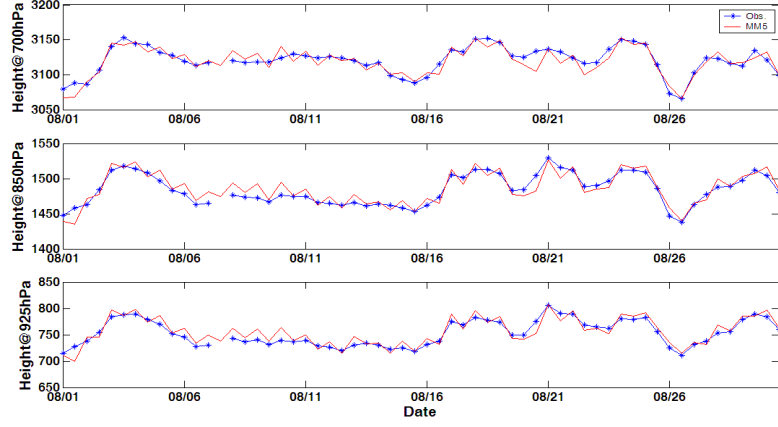


Figure 2: The comparison of the height in different pressure layers (700hPa, 850hPa and 925hPa) between the observed and modeled

and 925 hPa.

The error of the wind speed with the pressure-time shown in Figure 3, presents less model performance compared to the results obtained for temperature and pressure. However, in the vertical layers below 700hPa, the error of the wind speed is estimated to less than 5.0m/s, which is reasonable. The wind speed monthly error of 1.2m/s at the 1000hPa is also reasonable.

Figure 4 shows modeled relative humidity compared against observed data. As a whole, the high relative humidity in August in the vertical layers below 600hPa is consistent with MM5 results.

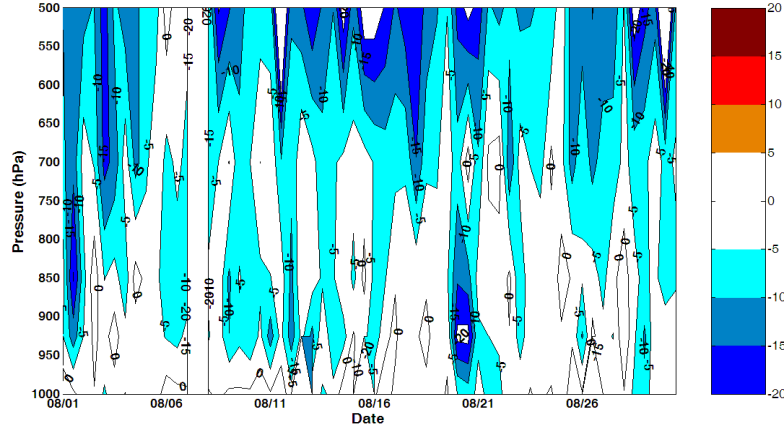


Figure 3: The pressure-time plot of the error of the wind speed (the error = modeled - observed)

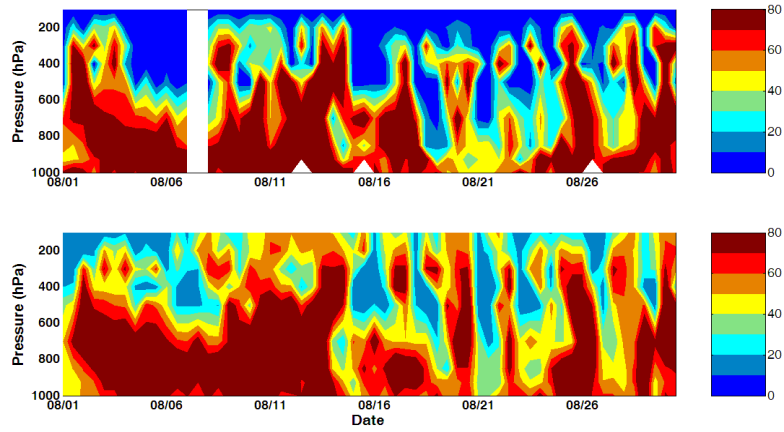


Figure 4: The comparison of the relative humidity (Rh) in different pressure layes between the observed and modeled: upper, the observed Rh; down, the modeled Rh