

AmtD - C828 - 830 2009

1,

Specific comments:

- Introduction: The paragraph on the estimation of the mixing height (MH) is rather weak. Please give information on uncertainties in the estimation of the MH using other data sets. This is in particular needed since the authors compare their results to those data (Yang et al.).

Reply:

We have added this to text. Please see Sect. 1.

2,

- Experimental: Sorry, but this section is a kind of an impertinence. At least basic parameters for the instruments used in this study are needed. Of course, one can find them in Chen et al., but for the potential reader of this journal it is necessary to have them here.

Reply:

We have added this to text. Please see Sect. 2.1.

3,

- Calculation of the effective trace gas mixing height: The instrument is located near the middle circle of Shanghai. One should expect very high local pollution from traffic in particular during rush hours. Therefore I'm more than sceptical that the assumed profile with constant concentrations within the boundary layer is realistic. The authors themselves point out that at least a constant mixing ratio is more supposable. But then they should give a rough estimation on the possible error using the wrong assumption and not just stating, that resulting errors are small.

Reply

We have added this in text, please see Sect. 2.2.

4,

- Results: How the monthly averages in Figure 4 are calculated? Are all values included? Taking into account the standard variations it is hard to conclude that the highest MH values occur in summer. How the errors for the Yang data are calculated? Why are the error bars missing for some months? High values of MH in January: The lifetime of NO_x is also higher in other winter months like e.g. December. Why one should have these exceptional high values of the calculated mixing height only in January.

Reply:

it's just the average of all days in one month, not any weighting. Table 1 illustrates how many measurement days in each month.

The highest MH in text means the average MH in one month, except January, for this there is explain in text, please seeing Sect. 4.3

There are just error bars in our data, no error bars for Yang's data (we picked the data from their paper).

Maybe monthly average of NO₂ concentration could be used to explain this, because NO₂ is used as a tracer gas in our method, so if the NO₂ is too lower in atmosphere, the NO₂ in free troposphere should make MH more overestimation.

In our paper, we do not want to say the MH in January is high, because our result in January is higher than expected, so we must to find the potential reason of this.

5,

- Discussion (Correlation between the ETMH and surface temperature): The whole argumentation is not very conclusive. Which months have been averaged for the values given in tables 2 and 3?

Spring: Feb., Mar., Apr.

Summer: May, June,

Autumn: Sep., Oct.

Winter: Nov., Dec., Jan.

- Discussion (Correlation between the ETMH and surface wind speed): Correlations are always quite small. Not sure that one can draw any conclusions from that. By the way: where the meteorological data come from? How representative are these data for the DOAS site?

To introduce a new method is the mainly purpose of this paper. Correlation of ETMH with WS is smaller than with T is just what we want to state in our research. The met data come from same site of DOAS.

- Discussion (Comparison with other results) What is the reason that the authors have not compared their results to those obtained from the MESSy model, which has been used in the Chen paper? Error bars in Figure 11?

Ok, we will add error bars in Fig 11.

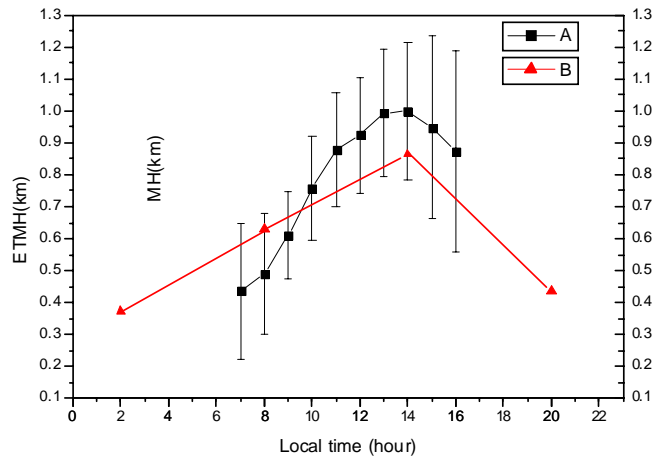


Fig 11

The main reason why we did not compare the result to those obtained from the MESSy model is that we think they are not in the same year, and we also think the daily variation of MH in the same month is different from year to year. it's better, we think, to compare our result to 15yr observation of MH in Shanghai.

In generally, it's a good idea to compare DOASA result with MESSy, so we add the comparison in text, please seeing Sect. 4.4.

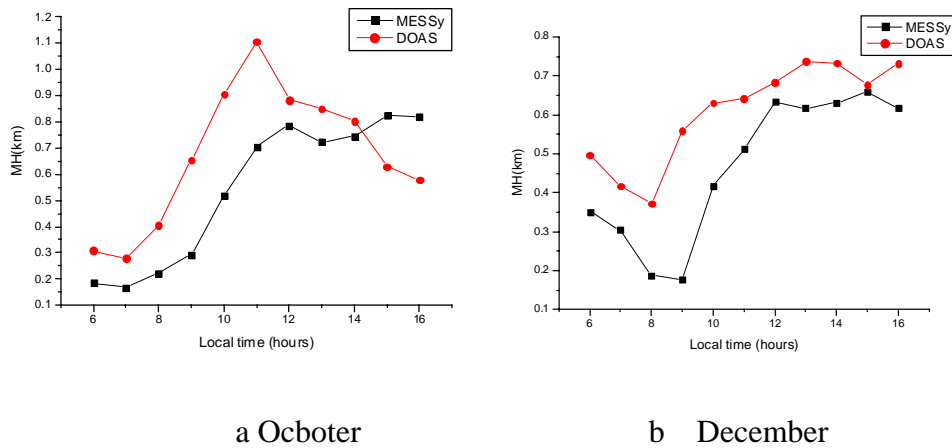


Fig.12 The comparison of MESSy and DOAS result shows the correlation is high as expected, it's 0.693 in October and 0.872 in December, but DOAS result is 0.127km, about 23%, higher than MESSy in October and 0.134km, about 29%, higher in December. But here it should be mentioned that the MESSy result is calculated in 2006, our measurement is carried out in 2007.

Further corrections/comments:

- Tables 2 and 3: Please combine tables, indicate which months have been averaged.
- Table 4: Please add this information to Figure 11 and remove table.
- Figure 2: Needless.
- Figure 3 has already published in Chen et al. (Figure 13)! Please indicate this and the date of the measurements.
- Figures 7 and 8: Confusing. What are the different colors/symbols? Information content for both figures quite small.

Rply:

Thank you very much! We have modified in text.