

## ***Interactive comment on* “The mixing height in urban areas: comparative study for Copenhagen” by A. Baklanov and A. Kuchin**

### **Anonymous Referee #1**

Received and published: 16 July 2004

The mixing height in urban areas: comparative study for Copenhagen

Baklanov and Kuchin

The main conclusions in the manuscript are:

1- the urban mixing height is considerable higher for the stable stratified (nocturnal) boundary layer cases in comparison with the rural mixing height

2- daytime mixing heights does not differ significantly in urban and non-urban areas.

I question these conclusions.

For the stable cases I checked the conclusion from the numbers giving in table 2. I applied a simple student-t test to examine if the mean values of the mixing heights over urban and rural areas were different from each other, taking rather typical a level

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper

of significance of 5% - which is rather conservative considering the large number of measurements. The mean values of the mixing height were in 3 (Ri, AR81 and BS) of the 5 cases significantly different, and in the remaining 2 (WMAX and HJMP) the difference was not significant. Not a very convincing result.

For the unstable cases, table 3, I did similarly and it is interesting to see, that in 3 cases (Ri, PAR and RAR) the mean values of the urban and rural mixing heights are significantly different, and in two cases (BS and PAR) they are not. The author for the unstable case concludes that the urban-mixing-height and rural-mixing-height does not differ significantly.

It is also a major problem, that the 5 methods that are used to extract the mixing-height from the radiosonde data produces dramatically different results  $\hat{U}$  leaving the question open  $\hat{U}$  what is the mixing height actually and what does the authors think it is? In the stable cases the range in the mean values of the mixing-height is a factor of 3, for the urban-mixing-height it is 261 to 783 metres, for the rural 189 to 595 metres. For unstable cases it is somewhat better, a factor of about 1.7 only - for urban-mixing-height 532 to 918 and rural-mixing-height 634 to 1130 metres.

Several of the mean values of the mixing height for the different methods within the same stability and land-use category are significantly different, which suggest that the methods reflect different physical processes. It is interesting to note that some that are significantly different for the urban are not significantly different for rural  $\hat{U}$  and vice versa. I did not manage to find a pattern.

My main outcome of this paper is that it is important to look into the different methods and seek to clarify why the difference is so big.

In conclusion I do not find the evidence for the authors conclusion on the difference between the urban and rural-mixing-height under 1) stable conditions and 2) unstable conditions justified and consequently cannot recommend the paper for publication.

[Full Screen / Esc](#)[Print Version](#)[Interactive Discussion](#)[Discussion Paper](#)

Interactive  
Comment

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper