

## ***Interactive comment on “Development and evaluation of an operational SDS forecasting system for East Asia: CUACE/DUST” by C. H. Zhou et al.***

### **Anonymous Referee #1**

Received and published: 26 June 2007

This paper describes an ambitious new assimilation scheme for the Asia dust problem. It is a nice new system, which seems to do ok compared to observations. A forecasting system is important to have in place. However the text needs substantial editing before it can be published. I recommend that this paper be folded in with other submitted papers before publishing.

The biggest problem with this paper is with the editing of the text. It is difficult to understand what is going on, and where we are going, what data is being used, etc. More clear explanations are required for the paper. A lot of details are completely left out, while unimportant information is furnished. I try to identify the main ones here, but

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I did not do this carefully for the entire text.

I would like to note that the authors submitted 3 papers simultaneously to ACPD, and all of them are not well edited, and it is not clear that the material deserves so many papers. Please consider reducing the number of papers greatly. Part of the evaluation of the assimilation system would be the present study—so they should probably be folded together. I accidentally started to review Niu et al., and noted that that paper needs substantial expansions and edits. Please submit fewer, but better papers, including many more comparisons and a methodology section for each paper.

Finally, please emphasize what we learned that was useful in the paper—not just that there exists such a system, but what elements were required to get the system to work? Does the assimilation add to your ability to make predictions? How does it do compared to persistence?

More details.

Figures 1-4: we see very little of interest in these plots—tell us what we are learning? What does the description on page 5 tell us about these processes? These are a sequence of events, discussing the observations—this is not telling us anything new about these processes or about how the model does well or fails. Most of the text on page 5 can be eliminated (or tell me why I should care about it, please).

For figure 5: please compare more quantitatively. Identify failures in the model. The model does not appear to capture most of the features in the LIDAR—is that good? If I am misunderstanding your points, maybe you should include better graphs, or descriptions (including maybe arrows pointing out what you want us to notice). Why was this particular time period shown, and not another time period? “For Beijing, both model predictions and lidar observations showed that the dust storm was transported to it through the upper air and settled down to the surface at about 19:00 (BST) in the evening. The dust concentration center located at 2000-3000m in 20 altitude.” I can’t see this at all in the observations—it looks to me like the model is getting the observa-

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tions wrong. Same with the analysis of Tsukuba.

There is too much discussion of individual events, and not enough about statistics. What is the correlation coefficient in Figure 6? How could we evaluate such a forecasting scheme?

Normally in weather forecasting, one compares model predictions to persistence and sees whether the model adds any information. Could you also do this for Figure 7? Summarize whether the model is adding information.

Editorial comments:

SDS: please do not make new, rather obscure acronyms. It makes the paper much harder to read than necessary. Please right out sand/dust storms every time.

Same for TS.

In the first paragraphs the citations are very irregular– Please cite one paper for each point that is not obvious, make sure it is the best citation, and try to be consistent, generally.

Page 2: lines 1-4: this is nicely set up, but then you don't tell us what you do–please do so and finish the thought here.

P 3: you go into too much detail in some places (what sigma surfaces the model uses), but do not tell us how you do the wet or dry deposition, or what bin sizes or size distributions you are assuming, which is much more important.

Section 2.4: Please tell us more about this assimilation system. It needs to be described and evaluated

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Interactive comment on Atmos. Chem. Phys. Discuss., 7, 7987, 2007.

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