

Interactive  
Comment

## ***Interactive comment on* “Characterization of aerosol pollution events in France using ground-based and POLDER-2 satellite data” by M. Kacenelenbogen et al.**

**L. Remer (Referee)**

Lorraine.A.Remer@nasa.gov

Received and published: 17 August 2006

This paper makes an important contribution to the application of satellite data for use in air quality monitoring. There have been a few studies showing the potential of using satellite-derived aerosol information to monitor and predict PM concentrations on the ground. Not all of these studies have been limited to the United States, as the authors state erroneously. In particular, (Chu et al., 2003; JGR, 108 (D21): Art. No. 4661 NOV 5 2003] shows the potential of using satellite data to monitor PM in the Po River valley of northern Italy. However, the United States has been quick to adapt satellite data into an operational air quality forecasting product [Al Saadi et al., 2005; BAMS,

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

86 (9) 1249-1261]. Still, as far as I know, all satellite products previously investigated are derived from the MODIS sensor aboard Terra and Aqua. This work explores the use of aerosol information derived from POLDER, and in doing so opens up brand new possibilities.

I find very little to criticize in this paper. The authors have done a good job and I wish them a speedy publication. There are just a few details to consider, which I would leave to their discretion.

1. The Chu et al. reference in regard to investigating AOT vs. PM relationships in Europe, as well as North America might be mentioned in the introduction.

2. There is a recent paper by Li et al. [2005; IEEE TGARS, 43 (11), 2650-2658] that demonstrates a better relationship between MODIS AOT and PM when the AOT is derived at finer spatial resolution than 10 km. Li et al. develop a 1 km product for the task. This is for the complex urban environment of Hong Kong. In general air quality forecasters have asked me for a finer resolution MODIS product, saying that 10 km is too coarse. Now, POLDER has even coarser resolution. Have the authors considered the effect that this coarse resolution has on their results?

3. The conclusions found here are based on April-October data. The authors point out that the winter produces more significant PM events, which may be linked to winter-time lowering of boundary layer heights. It is very possible that the AOT=0.17 threshold that divides AQCs may be very different in the winter, and the correlation between AOT and PM may be very different in the winter. I would state this caveat in the abstract and in the conclusions.

4. I found the regression equations between AOT and PM to be very interesting, but the authors do not elaborate on this point at all. In this study, the slope of the regression is about 25 ug/m<sup>3</sup> per unit AOT. Right now, based on work that we've done with MODIS, the operational IDEA product is using a conversion number closer to 60 ug/m<sup>3</sup> per unit AOT, with no offset. Chu et al. 2003 find a similar number in Italy, but regressed

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)

against PM<sub>10</sub>, not PM<sub>2.5</sub>. Wang and Christopher find it to be 70 for their local study in Alabama. Li et al. (2005) find a much higher number, 200–400  $\mu\text{g}/\text{m}^3$  per unit AOT in Hong Kong. The 25  $\mu\text{g}/\text{m}^3$  of this study appears to be low. However, Engel-Cox et al. published in 2004 a regression slope of 19  $\mu\text{g}/\text{m}^3$  per unit AOT for daily values. There is much hidden in a simple regression. PM<sub>2.5</sub> or PM<sub>10</sub>? AOT at 550 nm or at 440 nm? Forced through zero or allowed an offset? Still, I was surprised to see it as low as the Engel-Cox study. I would welcome any discussion on how this present study agrees with or disagrees with previous findings. For example, would we expect POLDER and MODIS to arrive at the same quantitative relationship between AOT and PM? Would POLDER's sensitivity to fine particles make a difference? Would the different spatial resolutions matter?

5. Why 440 nm? Why extrapolate from 670 nm?

6. Some minor comments.

P. 6306, just above eqn (1). “the number of PM<sub>2.5</sub> observations that overpass the 15.5  $\mu\text{g}/\text{m}^3$ ” I would use the word “exceed” instead of the word “overpass”.

Table 1. In the caption, please explain the last column.

Fig 1. The authors may want to label the bottom axis with English abbreviations of the months instead of French. Jan. , Mar. May, Jul, Sep., Nov.

---

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 6299, 2006.

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)