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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Size-segregated fluxes of mineral dust from a desert area of northern China by eddy covariance" *by* G. Fratini et al.

Anonymous Referee #2

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This article describes a method developed for the purpose of directly measuring fluxes of mineral dust from the desert to the atmosphere. The theoretical basis for the technique is described and the technique is applied at two sites in the Gobi Desert of northern China. The data is presented with analysis, and represents the first direct flux measurements of dust from northern China. The article is straight forward, clearly written, and I believe makes a significant contribution to furthering our understanding of the origins of atmospheric particulate matter. Following are some general points that I believe would strengthen the paper if addressed of clarified.

The paper's primary goal is to describe the applicability of a measurement technique; therefore, I think more detail needs to be given to the following:

Particles down to a diameter of 0.26μm were measured. For the data described in the paper it is unlikely that a significant portion of counted particles would have had a non-mineral dust origin. However, if this method was deployed elsewhere it is not clear that one could differentiate between mineral dust and particles derived form other sources. This is particularly important in the less than 1.0μm size range, which included a significant fraction of the measured number concentration.

Much of the data presented were for a 'storm event' that occurred near the end of the measurement period. Specifically, how was the storm event characterized other than by a significant increase in particle number concentration?

Some discussion was given to the fact that due to the dilution of inlet air, there were periods when the number of particles counted per sampling period was not statistically representative. Typically, how many particles were counted during a sampling period with the instrumentation set up as described?

How much power does the instrumentation require? How was power supplied for this experiment? If the power source was local, was there any chance of particle contamination?

To make the paper more of a 'data and analysis' paper rather than a 'technique' paper, I believe that the data analysis needs to include a detailed discussion of how these reported flux measurements can be used to 'parameterize the emission process either in global transport models and in models devoted to predict wind erosion and sandblasting'. This statement is made in the conclusion, but is not explored explicitly in the discussion. A nice comparison is made in the paper between the measured particle number concentration and the NAAPS model, but this does not demonstrate the utility of the flux measurements.

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