

Interactive comment on “Large Asian dust layers continuously reached North America in April 2010” by I. Uno et al.

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Received and published: 16 July 2011

Reply to Reviewer 2 Thank you very much for your kind reviewing of our manuscript. We have revised our manuscript according to your comments and suggestion.

Anonymous Referee #2 The authors present the results of simulation of large Asian dust layers and their validation by CALIPSO satellite data. They concluded that the large dust layers are related to the Arctic oscillation, the strong stable westerlies, as well as the negative and positive pressure anomalies. The paper is well organized and written. It can be published in ACP journal with some minor modifications.

Specific Comments Introduction

#2-1 Page 12253, line 9: “anomalous” should be “anomaly”

C6488

Thank you. We believe the word anomalous is correct.

Observation data and dust transport model #2-2 Page 12253, lines 21&22: it's not clear why the authors chose the lidar ratio as 35sr and the inversion height as 14 km in the paper. Please give a brief explanation for choosing the lidar ratio as 35sr and the inversion height as 14km in the context of this paper.

Please see our reply to #1-1, which explains our choice of the smaller S1 value for CALIOP inversion. We used the forward Fernald inversion method. To achieve a successful and stable inversion solution, the top boundary height (where we can assume no background aerosol layer) must be lower. We assumed that the background aerosol concentration at the height of 14 km can be ignored and that this height layer does not include the main part of the stratosphere (please see lines 61–63).

#2-3 Page 12255, line 2: delete “, which”

This was corrected.

Results and discussion #2-4 Page 12255, line 6: “asian” should be “Asian”. Also, the multiple Asian dust layers have been reported by [Su and Toon, 2011], ACP paper, which may be referred or compared in the paper. Su, L., and O. B. Toon (2011), Saharan and Asian dust: similarities and differences determined by CALIPSO, AERONET, and a coupled climate-aerosol microphysical model, Atmos. Chem. Phys., 11, 3263–3280, doi:10.5194/acp-11-3263-2011.

We corrected the capitalization of “Asian.” We also added a reference to Su and Toon's (2011) study in the revised manuscript.

#2-5 Page 12257, lines 10-15: Do these high or low centers have specific names? Such as North Pacific High or Aleutian Low, etc.?

We revised the text and included the formal names of the high and low centers.