

## ***Interactive comment on “Increasing synoptic scale variability in atmospheric CO<sub>2</sub> at Hateruma Island associated with increasing East Asian emissions” by Y. Tohjima et al.***

### **Anonymous Referee #2**

Received and published: 15 September 2009

#### General Comments:

This paper presents a 10-yr record of CO<sub>2</sub> and CH<sub>4</sub> variations at Hateruma Island. By using a simple method, the authors argued that the inter-annual variations of CO<sub>2</sub> are associated with increased fossil fuel emissions in East Asia. The topic of this paper is suitable for ACP and the paper is clearly organized and well written. This paper should be published on ACP after minor revisions.

#### Specific Comments:

The authors attributed the CO<sub>2</sub> variations to the increase of fossil fuel emissions. How about biofuel emissions? Although I don't believe that CO<sub>2</sub> emissions from biofuels

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were increased as much as fossil fuel emissions, biofuel emissions could also have significant inter-annual variations. The potential impacts from biofuel emissions should be discussed.

P15728, L24: The modeling period should be stated in this paragraph.

P15729, L5: I would like see more detail description on the fossil-fuel emission inventory used in this study. Did you include the emission increase of East Asia during 1995-2007? If so, which inventory is used in your model? Olivier and Berdowski, 2001 refers to EDGAR 3.2 and it only provides emissions in 1990 and 1995.

P15729, L22 and P15734, L5: Does the trajectories have significant inter-annual variations?

P15734, L14: "The increasing trend in PO  $\checkmark$ CO<sub>2</sub> is likely due to the transport of maritime air mass contaminated by continental air from China. This statement needs more evidence. Maybe 7-day back trajectory analysis could help.

P15735, first paragraph: The sharp dip in 2006 is interesting. It seems like China's emissions were continuously increased until 2006. This is supported by both inventory study (INTEX-B emission inventory) and satellite observations of NO<sub>2</sub> columns (both NO<sub>2</sub> and CO<sub>2</sub> are mainly from energy use). It would be helpful if you can analyze the year 2006 specifically. For example, does the air mass origins in 2006 different from other years? Or any anomalous meteorological conditions?

P15735, L5: Could you also plot the values only including air masses from JK and ST and see if there are significant decrease in 2006 and 2007?

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Interactive comment on Atmos. Chem. Phys. Discuss., 9, 15725, 2009.

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