Interactive comment on “Increasing synoptic scale variability in atmospheric CO\textsubscript{2} at Hateruma Island associated with increasing East Asian emissions” by Y. Tohjima et al.

Anonymous Referee #1

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Review of “Increasing synoptic scale variability in atmospheric CO\textsubscript{2} at Hateruma Island associated with increasing East Asian emissions: by Y. Tohjima et al.

General Comments and Questions

The paper present an interesting analysis of the CO\textsubscript{2} variability at Hateruma Island from 1996 to 2007 based on continuous measurements and atmospheric modeling. The article is clear and well written. I present here a few suggestions to improve the clarity and to support the conclusions of the paper.

Question 1: Could you do a model run with constant fossil fuel CO\textsubscript{2} emissions for East Asia (or China) and show that the CO\textsubscript{2} SSV at Hateruma Island is different from the observations... To separate the various source regions you could also consider tagging in the model the CO\textsubscript{2} and CH\textsubscript{4} coming from China versus Japan versus Korea versus Rest of the World.

Question 2: Would you consider doing \textsuperscript{14}C analysis on CO\textsubscript{2} samples to isolate fossil fuel emissions contributions?

Specific Comments by Section

P15726 Abstract:
Line 13: change to “as indicated in the Marland et al. [2007] emissions inventory data”. CDIAC here is a data center/repository not the author of the data set.

Introduction
Line 22: change to “Although there are international discussions to reduce...”

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Introduction
Line 3: change to “Increasing fossil fuel CO\textsubscript{2} emissions in East Asia elevate...”

Line 12: Emission patterns of CO\textsubscript{2} and methane are not similar... May it be more that in the winter time, at a remote site like Hateruma Island, you will see emissions contributions from populated areas for both CO\textsubscript{2} and methane... The lifetime of methane is \(\sim 10\) years so replace “\(\sim\text{month-year}\)” with “\(\sim\text{decade or more}\)”.

Line 22-23: Specify that you look at winter time data only.

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Data and Methods

What do you use for biomass burning emissions and could you show a map of winter time emissions of CO\textsubscript{2} and methane for East Asia?
P15733 Discussion

Line 15: do you have a proper citation or web reference for the REAS inventory?

Question (same as above but in the context of the paper here): Could you do a model run with constant fossil fuel CO2 emissions for East Asia (or China) and show that the CO2 SSV at Hateruma Island is different from the observations... To separate the various source regions you could also consider tagging in the model the CO2 and CH4 coming from China versus Japan versus Korea versus Rest of the World.

Technical comments

P 15728 Line 13: fix typo: 4.6 cycles Line 18 remove “each other” P 15733 Line 28: when the backward trajectory first crosses the corresponding regional boundaries.

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