

Interactive comment on “Estimating Asian terrestrial carbon fluxes from CONTRAIL aircraft and surface CO₂ observations for the period 2006 to 2010” by H. F. Zhang et al.

Anonymous Referee #2

Received and published: 20 December 2013

General comments

This article focuses on Asian terrestrial carbon fluxes using ensemble Kalman filter method adopted by CARBONTRACKER. The important feature is that the authors make use of continuous aircraft dataset obtained by CONTRAIL project in this analysis system. As some previous studies show that the aircraft dataset are significantly available to constrain Asian carbon fluxes. The combination of the analysis method and this observation data is new and this article has a value for publish. However, the authors do not show their analysis results in global scale in this article and this make us difficult to evaluate their analysis system correctly. I recommend comparing their

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analysis result in global scale with other inversion study for acceptance. Especially comparing with CARBONTRACKER in US or Europe is preferable as the analysis system is almost similar to them.

Specific comments

P27604, line 17: In realistically, the region number is less than 239. The authors should show actual number to see a number of freedoms. Is it similar to original CTDAS?

P27605, line 24 and Fig. 2a: It is difficult for us to evaluate whether your observation network is suitable or not. The authors should show all observational sites in Fig. 1.

P27608, line 7: The authors should show land use maps (MODIS) in Case 6.

P27608, line 20 and table 1: To evaluate the authors' transport model performance including prior CO₂ flux, it is better to compare not only assimilated CO₂ but also simulated CO₂. The results could indicate some information about prior flux. Also non-Asian observational data (not all but representative sites) are available for such purpose.

P27613, line 1 and table 3: In this table, the authors should add results of the same period (2008 – 2010) in Case 1 and 2 to compare similar condition and rewrite this section (3.2.3).

P27614, line 24-: I consider the difference is affected by strength of vertical mixing (maybe cumulus convection in tropical region) in transport model. The authors should comment it.

P27615, line 1-: The fact that authors used BKT site in their analysis is consistent to the low error reduction rate in Tropical Asia region. I consider observation network is also important factor to evaluate error reduction.

P27616, line 6- and table 6: The authors should compare not only averaged Asian CO₂ fluxes but also time series of them. As there may be large inter-annual variation

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in Asian CO₂ fluxes and it is hard to obtain meaningful results by comparing only averaged fluxes.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 27597, 2013.

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