

## ***Interactive comment on “A global carbon assimilation system based on a dual optimization method” by H. Zheng et al.***

**Anonymous Referee #2**

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H. Zheng et al. present in their manuscript ‘A global carbon assimilation system based on a dual optimisation method’ an inversion of 8 years of atmospheric CO<sub>2</sub> data to estimate terrestrial and oceanic CO<sub>2</sub> fluxes. The authors use what they call a ‘dual optimisation’ method to solve for scaling factors of terrestrial oceanic flux patterns based on prior fluxes obtained from the terrestrial ecosystem model BEPS and CarbonTracker output in the case of the ocean. These scaling factors are differentiated by BEPS plant functional types and latitudinal zones. In addition, the authors also solve for the fluxes directly, that represents the dual optimisation method. The manuscript is not very clear in its methodology description. Therefore it is unclear if the flux is solved for globally or per gridcell on a 1x1 degree resolution.

Besides this unclarity there is a major problem with the set-up of this inversion sys-

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tem. The authors write that they use optimised ocean fluxes from CarbonTracker as their prior ocean fluxes (p14284, ll 26/27). Since the optimised CarbonTracker ocean flux has been derived from essentially the same atmospheric CO<sub>2</sub> observations as used in this study for the inversion, the prior ocean flux is then of course not independent from the CO<sub>2</sub> concentration used in this study constituting a double usage of the observational data. This has to be fixed before one can analyse and draw any conclusions from the results.

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