

## ***Interactive comment on “Assimilating water column and satellite data for marine export production estimation” by X. Yao and R. Schlitzer***

**Anonymous Referee #1**

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This is an interesting paper, that badly needs professional English editing.

I cannot understand entire sentences due to poor English.

A medium resolution coupled bio-geochemical and variable resolution physical ocean model and its adjoint is used to assimilate satellite particular organic carbon in addition to water column nutrient data in order to estimate seasonal evolution of carbon export in the global ocean.

Both simulated fields are compared with their respective observations and to minimize the misfits, a cost functional is formulated.

The paper is well -informed but the parameter estimation via the adjoint model should present in detail the components of the cost function and the error covariance matrices

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used as well as address the issue of identifiability of the parameters estimated using the adjoint method ( see Navon (1998)).

The authors should explain the derivation of the adjoint model in presence of variable resolution.

Once this is done and the correctness of the adjoint method is validated using for instance the gradient test , this reviewer is prepared to consider recommending it for final acceptance.

References

Navon,I.M. , Practical and Theoretical Aspects of Adjoint Parameter Estimation and Identifiability in Meteorology and Oceanography. Dynamics of Atmospheres and Oceans. Special Issue in honor of Richard Pfeffer , Vol 27, Nos.1-4 , 55-79 (1998)

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Interactive comment on Geosci. Model Dev. Discuss., 6, 2045, 2013.