

Interactive comment on “Mesoscale modeling of the CO₂ interactions between the surface and the atmosphere applied to the April 2007 CERES field experiment” by C. Sarrat et al.

Anonymous Referee #1

Received and published: 2 February 2009

This paper describes calculations with a mesoscale model of CO₂, water and energy exchange between the land and atmosphere, and compares model output with observations from a measurement campaign in south west France involving surface flux stations, tall towers and aircraft. Some features of the model are adjusted to improve the fit to the observations.

This study is within the scope of Biogeosciences, and if published would make a modest contribution to the field.

Specific comments:

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This paper doesn't give many details of either the model or the dataset, the model is described elsewhere and the observations seem to be only summarised. Therefore it seems that the contribution of this paper is new calculations with the existing model using a new dataset. Although it is not entirely clear to me whether there are other papers that describe CERES 2007 in more detail, or whether the intention of this paper is to be the main reference for this experiment.

Given that respiration depends on soil moisture, but the parameterisation in the model does not depend on soil moisture, the model would have to be recalibrated for different soil moisture conditions. It appears therefore that the present study hasn't improved the model, but has shown that it can reasonably reproduce the observed space-time variation of CO₂ concentration.

p518, line 8 - could the authors briefly define Bowen ratio, for readers new to this field?

P520, line 9 - What improvement do the authors mean here?

p520, line 21 - why is the model initialised each day, rather than running continuously over the whole period? What local time does 18:00 UTC correspond to?

p522, line 11 - were the 2 steps done at the same time, or was the ecosystem respiration for C3 and C4 crops recalibrated before the land cover database was modified? If the 2 steps were done sequentially, would the recalibration have been the same if done with the modified land cover? Or does it not matter whether they are done separately?

p522, line 20 - If the model was parameterised for wet soil, does that now mean it will not model dry soil well? Is there a plan to include the influence of soil moisture on respiration in this model?

p525, line 7 - do the authors know why the second night is well modelled and the others not?

p529, line 25 - I am not sure that I would use the word 'excellent' here, the match seems reasonable.

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Is the data from CERES available for others to use?

Technical corrections:

There are too many typos to list here, the paper would benefit from a careful edit for typos and to improve the English. Here are just a couple of corrections:

p524, line 23 - picking should be peaking.

p528, line 15 - 'two' should be 'too' (in 2 places)

p534, fig 1 caption line 4 - coat should be coast.

There are very small fonts on many of the plots.

Interactive comment on Biogeosciences Discuss., 6, 515, 2009.

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6, S30–S32, 2009

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