

Interactive comment on “Mesoscale circulations over complex terrain in the Valencia coastal region, Spain, Part 2: linking CO₂ surface fluxes with observed concentrations” by G. Pérez-Landa et al.

Anonymous Referee #1

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The paper describes a carefully executed modeling study of mesoscale interaction of land and sea breezes with CO₂ concentration fields in a mountainous area near Valencia. The modeling is well done, and clearly shows the potential of this type of modeling for understanding meteorology (Part 1) and CO₂ concentrations (Part 2) in this area.

I have a few problems.

- 1) I wonder how the plane has flown as only vertical profiles of concentration are
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- used and the horizontal ones may provide additional key information about the models ability to generate the concentration fields.
- 2) The paper balances, between the use of CO₂ as a tracer and the promise of linking surface fluxes to the regional concentration variability. I suggest to stick to the tracer issue and maybe even combine paper 1 and 2, as it their separation is rather artificial.
 - 3) The use of rectification is a little confusing. Maybe it is better to reserve this word strictly for the seasonal and diurnal effects as originally described by Denning et al. Rectification as used by the authors in this paper is almost synonymous with any type of heterogeneity.
 - 4) I fail to understand the use of the rice respiration rate on page 2866 as the profiles show that most of the respiration flux comes from the Mosaic and Citrus. In fact the whole treatment of Mosaic is of course rather poor, but allowable because I still feel that the profiles give a right “sense” of direction.
 - 5) I have some problems in following the switches between the various graphs in 4.1-4.3 and would recommend a slight more clearer and logical use.
 - 6) The blobs and distribution of CO₂ in Fig 9 are really nice.
 - 7) Some of the graphics captions in Fig 10 is hard to read.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 2853, 2006.

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