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Biogeosciences Discussions

Interactive comment on "Atmospheric turbulence triggers pronounced diel pattern in karst carbonate geochemistry" *by* M. Roland et al.

Anonymous Referee #3

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The paper is very interesting because it is related to biological and geochemical processes and to different turbulent exchange conditions. It combines two different methods: the direct measurements of carbon fluxes with eddy-covariance technique and the modelling of the carbon fluxes due to weathering. Of great interest is the parameterization of the ventilation effect with Eq. (2). The shortcoming of the paper is that both methods are not compared and both methods are discussed in parallel, e.g. Fig. 1 for eddy-covariance and Fig. 2 for modelling. Two additions should be made to the final publication:

1. Direct comparison of eddy-covariance measurements with modelling for the different exchange situations given in Chapter 4.

2. Determination of the site-specific factors in Eq. (2) to get a feeling for the accuracy

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of this parameterization.

This should be done for situations with a low biological respiration potential, because the combination of respiration fluxes and geochemical fluxes is still an ongoing issue (end of Chapter 5).

Because the model is briefly discussed in Chapter 2.2, the same should be done for the eddy-covariance method, mainly because the method used is not fully in accordance with the present state of art (McMillen model). Therefore lines 131-134 and lines 145-149 of the supporting material should be copied into Chapter 2. A table with all the devices and measuring heights would be helpful, and Chapter S1.3 could then be deleted.

Minor remarks: - p. 2010, line 2: The paper Baldocchi et al. (1988) was not related to “flux towers around the globe”; this was Baldocchi et al. (2001) - p. 2010, line 28: explain DIC - p. 1214, line 9: u*θ has probably the dimension m s-1 - p. 1215, line 2: give all constants of the respiration equation, including Q10 - Suppl. Line 68ff: this is an exact repetition of the main document

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