

## ***Interactive comment on “Soil methane oxidation in both dry and wet temperate eucalypt forests show near identical relationship with soil air-filled porosity” by Benedikt J. Fest et al.***

### **Anonymous Referee #3**

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The authors investigated the soil methane exchange at two Australian forest study sites differing in annual precipitation. Their major finding is that soil moisture is the main controlling factor and that the relationships of the two sites collapse if air-filled soil porosity, instead of water-filled pore space or volumetric soil moisture is used. The paper is of interest to the readers of BG and the main finding is of general interest to the community as it may trigger new approaches of simulating soil methane exchange if verified across a larger number of sites.

I have three major comments: (1) The study uses two different measurement systems at the two study sites. How can the authors ascertain that the two measurement systems do not cause systematic differences between the two sites? Without a cross-

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comparison between the two systems at the same site, how can we believe the differences/lack of differences between sites when normalised with AFP? (2) The results of the two sites should be presented together instead of separately for each site. (3) English style and grammar are in the need of checking by a native speaker.

Detailed comments: p. 1, l. 13-14: this sentence comes a bit as a surprise p. 2, l. 2: high compared to many VOC that are present in the ppt range ... p. 2, l. 24: Q10 values critically depend on the depth of the soil temperature used as a reference due to increasing dampening in amplitude and phase shift with soil depth p. 2, l. 28: initiate a new paragraph here p. 2, l. 15-17: would the authors be able to formulate some hypothesis regarding their research? this would strengthen the paper p. 3, l. 28: density p. 7, l. 8: did you check for linearity of tested relationships? p. 7, l. 17: how many longer gaps did you encounter at both sites? p. 7, l. 29-30: figures should be reference in chronological order, i.e. Figure 3 after Figure 2 Results section: the paper would be much more easily readable, if the results of the two sites would be presented together, instead separately – this would help making a stronger point of the major finding of this study; this argument also applies to Figures 2 and 3, which should be combined in my view p. 10, l. 20: diffusion-limited p. 10, l. 22: able to demonstrate p. 10, l. 31-33: reformulate in proper English p. 11, l. 3: I do not get the “However” p. 11, l. 11: what does “defined role” mean?

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