

## ***Interactive comment on “A Predictive Algorithm For Wetlands In Deep Time Paleoclimate Models”*** **by David J. Wilton et al.**

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Received and published: 18 January 2019

We thank the referee for their review and will revise the text in response to each of the points raised. We will make the minor alterations and clarifications the referee has requested in due course. Below we respond to the more substantive comments.

“I am fairly convinced this is a sensible and useful approach, but I must admit to being slightly baffled about the exact methods employed – I found the paper rather unclear in quite a few places. I would encourage the authors to revise the description of the methods to make it clearer. “

We will add to the introduction to better outline the paper and methods we explore.

“Some clarification on how this approach should be employed by the wider modelling

C1

community would also be appreciated – can the method be embedded within ESMs to calculate wetland emissions online? Or is it envisaged as an offline only tool? I wasn't clear. If the authors can clarify the methods”

This has been used as an offline tool. We will add to the discussion at the end with respect to this.

“L71 So you are using DGVMs to simulate vegetation distributions, rather than using present-day observational datasets. It may be worth saying that the DGVMs have (presumably) been evaluated elsewhere.”

We give references for the two DGVMs we use when they are first mentioned in section 2.1. Earlier, L71, we think it should be sufficient to simply say that references for those DGVMs will be given later in the text, and will revise L71 accordingly.

“L68 Is it worth briefly defining wetland? Perhaps earlier. E.g. the RAMSAR definition. Is it obvious how such definitions translate into a climate model-specific definition? (Water depth, etc.). What is the basis of the modern day reference data set of FW? Can you say it is ‘known’ or ‘observed’ FW? “

We will add to the text to briefly define wetlands. We use the term ‘observed’ to distinguish the reference FW from our later modelled FW. This will be clarified.

“L145 It would be useful to provide a summary table of the test/reference data sets to clarify exactly how you are going to evaluate your approach; I didn't find the current explanation completely clear.”

We will add such a table.

“L318 I think the term ‘maxKNN’ appears here for the first time and isn't defined. Is it just KNN with  $K > 1$ ? (As suggested by I316.) “

Yes the term maxKNN does appear for the first time here in the section title. We will rename that section to “Maximum of K nearest neighbours FW prediction” and define

C2

maxKNN later in that section

“L364 In a similar vein to the last comment – why not just 3NN rather than max3NN?”

‘3NN’ does not indicate it is the maximum of those 3 nearest neighbours, it could imply any function of the three nearest neighbours, therefore we prefer to use max3NN.

“L409 I got a bit confused here about EVT. It seems EVT is from the vegetation models; but EVT must also be calculated in the underlying climate model – I guess with a much more simplified vegetation scheme. Is there a large discrepancy between the EVT in the vegetation and climate models? Isn’t this a bit of a problem? This decoupling of the simulated water budget between the climate model and the vegetation model should be clearly explained earlier in the methods section, and the implications discussed here.”

EVT, as used throughout the paper, is always from the vegetation models. We have not considered EVT from the climate model. So long as it is the same EVT used at all times in our modelling of FW, i.e. same definition for reference and test data sets, this should not be an issue. We will clarify that here.

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Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2018-213>, 2018.