

Interactive comment on “Diurnal, seasonal and long-term behaviour of high arctic tundra-heath ecosystem dynamics inferred from model ensembles constrained by time-integrated CO₂ fluxes” by Wenxin Zhang et al.

Anonymous Referee #1

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The main objective of this study was to examine the role of major physical and biological processes regulating the diurnal, seasonal and long-term variation of CO₂ fluxes and to estimate the ecosystem C budget based on different temporal (i.e. diurnal, seasonal and long-term) behaviour model ensembles.

I found the manuscript hard to read. The introduction lacks focus, the methods are sparse and filled with jargon, and the results are indigestible with acronyms. We miss a clear message, a thread to follow. The standard of English used is low. I was confused by the figures, few of which tell a clear story.

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The approach is to calibrate a veg-soil model against 15 years of eddy flux data, using different temporal domains. However, the method is very confusingly described so it is not clear how the diurnal, seasonal, and long-term model calibrations are actually produced. Details like how gaps in the flux data are dealt with are not covered effectively. Wavelet analysis is employed, but its use is not well justified, and its products are confusing. It is not clear how we are to interpret figure 2, for example.

The discussion is weakened by a lack of clear hypotheses to test, so that the argument jumps between many results unsatisfactorily. As the authors state, the lack of any validation against observations that reflect seasonal variabilities in the biological responses, e.g. LAI, is a major weakness. I remain unclear as to what has been learned, the novelty of the study.

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