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Interactive comment on "How well can we predict soil respiration with climate indicators, now and in the future?" *by* C. T. Berridge et al.

Anonymous Referee #2

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Berridge et al aim to investigate the relationship between soil respiration and temperature and precipitation using a global data set of soil respiration. However the study is not convincing. Due to the strong spatial heterogeneity of soil organic matter globally, the dependence of the respiration flux on the availability of substrate has to be accounted for when the climatic controls are investigated. The authors do not account for this important factor in their analysis.

Additionally, the authors fail to distinguish between the soil respiration flux and the rate constant. The flux is a product of substrate availability and the rate constant. The latter one is temperature dependent in models not the flux itself, in contrast to what the authors imply. Thus, using the correlation between the respiration flux and temperature found in this study to argue the temperature dependency of the rate constant, as used

in models, is wrong, is no valid.

The authors suggest the use of a CO2 correction factor for respiration in models. This correction factor likely reflects the effect of CO2 on substrate availability rather than a direct effect of CO2 on soil processes. As Colin Prentice pointed out the 25% increase compares nicely to the CO2 effect on plant productivity found in CO2 manipulation experiments. Changes in substrate availability due changes in plant productivity are accounted for in models.

I share the view of the authors, that the temperature dependency of soil respiration used in global models is problematic, but unfortunately this analysis of a data set of soil respiration does not contribute to its improvement.

Interactive comment on Biogeosciences Discuss., 11, 1977, 2014.