

Interactive
Comment

Interactive comment on “Does soil moisture overrule temperature dependency of soil respiration in Mediterranean riparian forests?” by C.-T. Chang et al.

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Received and published: 21 July 2014

This MS describes a straightforward experiment conducted to show how the soil moisture regime modulates the temperature response of soil respiration, and its heterotrophic component, which was experimentally separated. The presentation is generally clear, and the interpretation of the results is supported by an analysis of relevant literature. The results are of potential significance for carbon cycle modelling: there has been much written about the temperature response of heterotrophic respiration (even if not all of this has been illuminating!) but far less about the impact of soil moisture, and its interaction with the temperature effect.

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I have a few suggestions to improve the MS.

1. It should be made clear at the outset (in the Abstract and Introduction) that the first-order control of soil respiration is net primary production (NPP). This is currently not mentioned, so the MS as it stands potentially could contribute to the unfortunate misunderstanding that direct environmental influences (soil temperature and moisture) are the principal controls on soil respiration. This is even stated as a fact, but it is incorrect. When considering major environmental gradients, the principal control on soil autotrophic respiration is below-ground NPP, and the principal control on soil heterotrophic respiration is total NPP – the ultimate source of all soil organic matter (SOM). I don't think that neglect of this fact has much influence on the interpretation of the results presented (because they focus on directly observed temperature and soil responses, over a modest range of NPP), but nonetheless, the background should be stated clearly and accurately, and it should be explained why differences in NPP are considered unimportant for this particular study.

2. Exponential responses to temperature are assumed throughout. I have no problem with this simplification for data-analysis purposes; however, it is incorrect to cite e.g. the Lloyd and Taylor paper as authority for an exponential response, when that paper actually shows a better fit to a modified Arrhenius-type response.

3. At the end of the MS (starting p 8005, line 22) a facile statement is made about soil moisture becoming an increasing issue for “most terrestrial ecosystems”. It is not at all clear that this so, as precipitation also tends to increase (globally) with warming. It is however true for some regions, notably those with mediterranean-type climates, which are experiencing precipitation declines and projected to experience more of the same in the future. This statement should therefore be amended to be more accurate.

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Interactive comment on Biogeosciences Discuss., 11, 7991, 2014.

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