

Interactive comment on “Autotrophic component of soil respiration is repressed by drought more than the heterotrophic one in a dry grassland” by J. Balogh et al.

Anonymous Referee #2

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The manuscript “Autotrophic component of soil respiration is repressed by drought more than the heterotrophic one in a dry grassland”, investigates soil respiration and its components (ie rhizospheric, mycorrhizal fungi and heterotrophic respiration) of a dry grassland site in Hungary. To separate respiration authors uses of root-excluded and root- and mycorrhiza-excluded soil tubes (ie inox meshes and tubes) and measurements of CO₂ efflux and its isotopic (¹³C) signal under different climatic conditions. Authors show a decrease of all three components efflux under drought conditions. Results provide evidence that during drought contribution of heterotrophic respiration is the major contributor of the measures soil efflux whereas rhizosphere is most sensitive to drying. The manuscript interesting and worth to be published, however according to

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the comments enclosed, I suggest to have a major revision before publishing.

Introduction is a point alignment of factors affecting soil respiration, while reader has a hard time to see where authors want to guide to, and what is most important to the soil respiration (diel pattern, season, temperature, biomass, CO₂ ...) and the of the paper particular. Also the mycorrhiza seems important in this study, however this topic is not introduced at all. Accordingly, I miss the harmony and the linkages between introduction points. A long the same lines, paper deal with dry grasslands, but reader has no idea if this ecosystem (and C balance) is important to global (regional) scale or whatever. ... Accordingly authors should mention at the beginning of intro the role of dry grasslands in Europe ... As well as the importance of soil respiration to whole balance eg Schulze et al 2009. And what can we learn having a better understanding of the different components and what do we miss. Also by including the new knowledge, is there something we can do about future climate risks? what is the relevance of the study?

According to relevance, the paper deals with dry grasslands, but reader has no idea if this ecosystem (and C balance) is important to global (regional) scale or whatever. ... Accordingly authors should mention at the beginning of intro the role of dry grasslands in Europe ... As well as the importance of soil respiration to whole balance eg Schulze et al 2009. And what can we learn having a better understanding of the different components and what do we miss. Also by including the new knowledge is there something we can do about future climate risks? In first lines of introduction authors introduce the main subject, to me this arrives a bit quick (P 166887 L4) and reader does not know the emphasis of the assessed topic. Suggest to introduce first soil respiration and percentage of the different components and explain from where these come, followed by factors affecting soil respiration. Here Authors should class form the most important or the less or the other way round. As for the isotopic part, reader does not understand while of sudden this is a topic; here authors should mention that there are several ways to separate respiration components According to P16895

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L1 isotopic signal does not vary over time? And what about spatial distribution?

M&M. CRDS; Here I missed more details on measure points of gas measurements. Chambers measure in 3min but at what frequency concentration is measured within this time interval, 1Hz ??? is there a linear increase of gas concentration in the chamber ?? Soil respiration chambers, to be hosted I did not get the vent hole point. . . and the chamber is inserted in another? I schema may help here, except this was published in Nagy et al 2011.

Personally I found it a bit weak to have no replicate measurements of isotopic signature of R_{re} and R_{rme} . What about spatial distribution?

Results. Suggest to start with 3.3, to give an overall idea of metrological conditions over the experiment and then sort of insert 3.2 in this paragraph. The 3.1 should be last.

Discussion. Authors often mention that similar results (P16899) were found for a tall-grass prairie by Gomez-Casanovas et al. (2012). Here reader wonders what is new and what is different in the present study. Accordingly as mentioned earlier what is the role of dry grassland and what can reader learn from the present results. If results confirm others, can we think of an overall pattern, mechanism?????. Along the same lines I would not mention woodlands (P16899 L 25ff) as done here. As these ecosystem do not function in the same way. Would rather say that grasslands behave . . .xxx and woodlands do . . .xxx for a given reason. Accordingly start with paragraph (16900 L5-10) and then provide evidence with your results.

4.2 given the large SE, difficult to draw any conclusion on isotopic differences - suggest to move this paragraph to results.

4.3 this paragraph stands a bit alone. I wonder if the hyphen result cannot be connected to the 4.1 and be a further confirmation of the discussed mechanisms between woodland and grassland. In this case suggest to move up this paragraph.

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Specific comments Suggest to use the same wording and distinguish well “autotrophic” from heterotrophic as reader tends to get lost in the different wordings mycorrhizospheric, rhizospheric, mycorrhizal fungus . . . components , And as reader P 166887 L4: suppose this is not only the case for dry grassland but also for other ecosystems. May be give examples of the importance of the different systems %wise L5,6 Here we try to assess importance of different soil respiration component of a dry grassland ecosystem and their impact on carbon losses during drought. Legend Fig 2, suggest to repeat once to reader the acronyms of the different R's. authors can then further refer to this.

Interactive comment on Biogeosciences Discuss., 12, 16885, 2015.

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