

Interactive comment on “Differences in spatial and temporal root lifespan of temperate steppes across Inner Mongolia grasslands” by W.-M. Bai et al.

Anonymous Referee #2

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The scientific significance of the ms is high as data about root lifespan in different ecosystems and for different functional plant groups are urgently needed for understanding and modelling of belowground C –cycle, where the uncertainties of estimations are the highest. The ms presents valuable data of root longevity in three types of temperate steppe. The major concern is that text of the ms is not focused and clear, it is quite hard to follow, first there are too many repetitive and general "empty" sentences (see specific comments). The language needs correction starting from typing errors to repetitions within one sentence: for example Page 20001-20002, lines 28-3: "In addition, several studies have suggested that lifespan of roots produced in different seasons may differ significantly because roots generated in different seasons can have

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varying functions (López et al. ... There are too many such sentences, it makes hard to follow the message. Moreover I suspect that some citations are not used correctly.

Specific comments: The introduction contains repetitive sentences, for example page 20000 line 21, 25, page 20001, line 7 all are reformulations of the statement that roots and their turnover (or longevity) are the link between plant and soil organic C. Or those two sentences on page 20001, lines 2-6 mean almost the same and are repetitive. Please be more focused in sense of text content. Page 20001, line 13, delete Dali from reference McCormack and Guo, 2014, Dali is the first name. Why not to use km² instead of hm², it would make 58500 km² instead of 5.85×10^6 hm² The aim of the work is not clearly formulated. Please do that! Page 20008, lines 7-9: what you mean with "they both were significantly higher", the sentence is confusing, please reword. Page 20008, lines 23-24: *S.grandis* occurs twice and *S.krylovi* is missing. Page 20012, line 6: This statement is not true in this context! I cannot get that publication that fast to control your statement, but check it definitely over, I think Eissenstat and Yanai (1997) said that smaller biomass allocation (can be converted to C) to fine root system associates with their higher turnover rate, and usually there has been also measured mass fluxes. In your studies it has not measured, so we do not know anything about estimates of C flux, we only know that the turnover rate is higher in *S. krylovi* type grasslands. It has a different meaning what you say, in your context, I understand, that decreased C allocation into roots causes' shorter lifespan, and I wonder that you have used exactly the same sentence also in Bai et al, 2008 and 2010, but you have not measured the fine root biomass, so we cannot assess the C flux, but in this ms you already cite yourself next to Eissenstat and Yanai. Once more, in this study you have not measured C allocation, you have measured root longevity - less living roots may account for as big C allocation by higher turnover rate as longer living root systems. It needs biomass estimation. Page 20014, lines 2-4, I am not convinced that soluble sugars in roots control their roots lifespan, I think that concentration is indicator of differences in physiology, and higher soluble sugar concentration is related to longer lifespan of roots, but not controlling. Table 1, column 4: I think you mean Inorganic

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N content instead of “concentration”? In text you also refer to N content in Table 1 (page 20012, line 1.) In Fig 5, the unit for Inorg N content is mm kg-1??? Please use consistently the same term for the same trait.

Interactive comment on Biogeosciences Discuss., 12, 19999, 2015.

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