

Interactive comment on “Technical Note: A combined soil/canopy chamber system for tracing $\delta^{13}\text{C}$ in soil respiration after a $^{13}\text{CO}_2$ canopy pulse labelling” by M. Barthel et al.

Anonymous Referee #1

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General comments

Barthel and co authors submit a technical note about a combined soil/canopy chamber system for ^{13}C in soil respiration after a $^{13}\text{CO}_2$ canopy pulse labelling. My main concern is whether or not this is new methods that need to be published. They claim that a similar chamber concept can only be found in Palta et Gregory 1997 (not Palta et al.). This has been used for a long time for gas exchange measurements, and also for labelling small plant (for example by Kuzyakov (reported in several papers, but see Kuzyakov Y, Ehrensberger H and Stahr K 2001 Carbon partitioning and below-ground translocation by *Lolium perenne*. *Soil Biol Biochem* 33, 61-74. The Schnyder's team

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in Freising used similar kind of dual compartment gas exchange chamber (Lehmeier C A, Lattanzi F A, Schaufele R, Wild M and Schnyder H 2008 Root and Shoot Respiration of Perennial Ryegrass Are Supplied by the Same Substrate Pools: Assessment by Dynamic ^{13}C Labeling and Compartmental Analysis of Tracer Kinetics. *Plant Physiol.* 148, 1148-1158.). More recently, Pumpanen et al (2009) have developed a similar system for ^{14}C labelling of tree seedlings (Pumpanen J, Heinonsalo J, Rasilo T, Hurme K-R and Ilvesniemi H 2009 Carbon balance and allocation of assimilated CO_2 in Scots pine, Norway spruce, and Silver birch seedlings determined with gas exchange measurements and ^{14}C pulse labelling. *Trees - Structure and Function* 23, 611-621). What is new is the coupling of laser absorption spectrometer to this kind of chamber (not the use of laser spectrometer per se) but does it deserve publication. To my opinion, it is mainly a question of tubes.

Does the paper contain enough new and relevant data that will make a research paper rather than a technical note? I guess the authors have thought 'no' as soon as they as submitted it as a technical note. The tight coupling has been described several times and the fact that the experiment is done in the lab on small seedlings is less existing than similar experience done in the field. The same apply for the suggestion that diurnal variation in ^{13}C composition of respired CO_2 can be explain by alternative use of starch/new photosynthate during day night cycles (Bahn et al. 2009, Plain et al 2009) The number of replicate ($n=2$ per treatment is very low for experiments that are conducted in the lab). The results are indeed rather imprecise: 'All parameters seem not be influenced by the soil watering regime, since values are in the same range'.

In conclusion, the authors have developed a nice tool that will make them able to carry on meaningful experiments in the future and to submit high quality research paper.

The manuscript also suffered from excess emphasis with sometime poor meaning like - 'allow continuous calculation of the most relevant ecophysiological parameters' - 'this novel system is highly applicable for ecophysiological research questions' - 'The results show that leaf metabolism is unequivocally and tightly linked to belowground processes

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Additional comments: Why are you using the los gatos equipment? You claim that this instrument is capable for in-situ measurements of the water vapour isotopic composition in air ($^{18}\text{O}/^{16}\text{O}$; $2\text{H}/1\text{H}$) and its respective mixing ratios, but no results are shown

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