**Biogeosciences**
Discussions

Open Access

# *Interactive comment on* "Recycling vs. stabilisation of soil sugars - a long-term laboratory incubation experiment" *by* A. Basler et al.

### Anonymous Referee #1

Received and published: 8 July 2015

The paper by Basler et al. investigates on the relative prominence of recycling versus stabilization processes of soil sugars, a relevant component soil organic matter (SOM). The authors have addressed the problem by performing a three year incubation of a silty loam soil, under different types of land use (i.e. respectively: arable land, grassland and forest) and by adding 13C-labelled glucose in order to track the possible incorporation patterns. Their main observations are that two main tracer dynamics take place for different sugars and these are all dominated by a pool which persists (i.e. high mean residence time, MRT), independently of soil C content. Higher labelled C incorporation is measured in the microbial biomass than in the $CO_2$ produced. The authors consequently suggest that all together these things point at the predominance of recycling over stabilization as main sugar dynamic occurring into soils. Understanding the fate of carbon in soils is of great relevance for the consequences it implies for soil

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

management and more in general for the global carbon cycle. This study gives insights on the possible degradation patterns of soil sugars, which are important contributors in these dynamics. However, as a general comment I would have expected that the authors had put more emphasis on the relevance and the contribution that this study may represent for the soil (and global) carbon cycle understanding. A statement or even a paragraph in the Abstract and/or in the Introduction sections which highlight these aspects would be beneficial for the paper. I also have some specific request for revisions that may improve the paper. However, I recommend publication in Biogeosciences after the authors consider them.

1. Introduction:

1) page 3, lines 2 to 3: Please add references to this sentence.

2) page 3, line 3: Please define the acronym SOM before you start using it in the text.

3) page 3, line 6: Although you introduce the concept of "mean residence times" already in the Abstract, I would suggest you to re-define it here and add again its acronym, i.e. MRT, because you are using it later in the text.

4) page 3, line 14: There is a typo after the colon, the sentence "their high degradability..." starts with an uppercase instead than with a lowercase letter.

5) page 3, lines 23 to 24: Please add references to this sentence. Besides, I would develop a bit this sentence by explaining which kind of effects you intend here.

6) page 4, lines 2 to 4: Please refer to the Figure/Table which show the experimental set-up reported here.

2. Material/Methods:

2.1 Study Site: It might be helpful to clarify the set-up of the experiment if you could draw a diagram showing the vertical section of the different soils and horizons employed in the experiment.

2.2 Soil incubation:

1) page 4, line 27: Please define "Corg", before using this abbreviation in the text.

2.4 13C analysis of individual sugars:

1) page 5, line 19: Please correct the typo "13C" to "13C".

2.4.1 Extraction procedure:

1) page 5, line 23: Please define TFA before using the acronym in the text.

2.4.2 Analysis:

1) page 6, line 7: I believe the title of this section is too generic. Please rename it as "Isotopic Analysis" for instance.

2.6 Calculation and statistics:

1) page 8, line 7: The number assigned to the equation should be (5), instead of (6) and consequently the numbers assigned to the following formulas need to be corrected as well.

3. Results:

3.1 Carbon concentrations and incorporation of the labelled C into soil organic matter fractions and the respired CO2:

1) page 9, lines 4 to 5: Please add the corresponding acronym after "microbial biomass" and re-define "ex-C" before using this abbreviation in the text.

3.3 Dynamics of label-derived C of the individual sugars:

1) page 11, line 1: I am not sure I understand what the letter "a" stands for, when you report the MRT for gal (5957a) and for rha (1-365a), calculated from the nonlinear regression analysis: it is not reported either in the text or in Table 3. Is it referring to Figure 3, panel a? Also please correct the extra space after 1-365.

4. Discussion: My main suggestion here is to add the references to Tables and Figures in the text while you discuss them in this section; it would make easier to follow your argumentation.

Figure 1. and 2.

1) page 27, lines 6 to 7 and page 28, lines 5 to 6: I am not sure I understand the different letters notation you use in this figures and how you explain it in the captions. Please rephrase this.

Figure 3.

1) page 29. Please correct the typo in panel c): the x axis label says [month] instead of [months] as for the other panels.

---

Interactive comment on Biogeosciences Discuss., 12, 8819, 2015.