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Biogeosciences Discussions

Interactive comment on "The sensitivity of microbial processes in Icelandic soils to increasing temperatures" *by* R. Guicharnaud et al.

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Dear referee #2. We would like to thank for showing interest to our research paper and are thankful for many constructive comments.

We agree with the author that the temperature is the main factor affecting microbial activity. However it is plausible that DOC is the controlling substrate since the highest DOC concentrations are observed at -10°C when the respiration is lowest. Hence lower activity due to low temperature results in highest concentrations of DOC. This sentence will be rephrased in the manuscript for increased clarity and reinforce that rightfully temperature is the main driver.

As per comment 2, we got a similar critic from reviewer 1 and have hence decided

to remove the sentence from the abstract stating that results are of importance to understand global soil dynamics.

As per comment 3, regarding description of sampling regiments. Before all replicate subsamples were placed in incubators soil was weighted for each measurements and placed in individual containers making them ready for analyses as soon as they where taking out of incubators for analyses. For example, 25 g (which is the amount of soil needed for that particular measurement) of sieved soils (soil where prepared at 4°C to minimise biological activity within samples) was placed in a container before incubation and hence was ready for extractions without affecting the soil microstructure after 2 weeks incubations. This was done for all soils and each measurement conducted in this current study.

Concerning soil bulking, the authors do not agree with comments concerning soil bulking limiting the value of the current study. There are a few reasons for this. Soil bulking is a recognized sampling method and involves sampling cores and bulking into one sample for representing a given area (Parkin and Robinson, 1992; Morton et al., 2000). On the other hand, when studying spatial variability in biological measurements within a given field soil bulking would not be recommended (Officer et al., 2006) as pointed out by the referee and the authors agree. However, the aim of this research paper was not to assess spatial variability within a given field but the direct effect of temperature on soil microbial processes with the aid of soil microcosms in a controlled laboratory study. Microcosms are miniature enclosed ecosystems which allow predetermined environmental factors and treatments to be measured in replicated, controlled conditions (Kampichler et al., 2001) as well as reducing environmental variables and allow predetermined environmental factors (Kampichler et al., 2001) which in this case was temperature. Including spatial variability from each site of this study was therefore believed at add environmental factors not relevant to this study. A future research however studying site specific factors on soils temperature respond would be of great value and interest. The authors have conducted a study investigating the suitability of differ-

ent sampling methods as well as the spatial variability of biological factors of Icelandic soils within a given field area, which has been submitted for publication elsewhere.

About the sampling sise. The authors have tested many different sampling sizes using up to 1 kg of field moist soil as a sample size and gone down to soil cores only 2.5 cm in diameter. In all cases however the variability has always great lilekly reflecting the high heterogeneity associated with soils.

Technical comments (line 675 line 16 excetera) have all be dealt with accordingly.

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Interactive comment on Biogeosciences Discuss., 6, 6749, 2009.