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Interactive comment on "Technical Note: Disturbance of soil structure can lead to release of methane entrapped in glacier forefield soils" *by* P. A. Nauer et al.

Anonymous Referee #2

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As technical notes go, this one by Nauer et al. is very nice and non-technical. The authors used two methods to measure methane fluxes from hard-to-work-in proglacial soils. They show that while long-term fluxes are very low (sub-atmospheric), mechanical disturbance of soils in a calcareous forefield can release bursts of methane. They argue that this may be due to entrapment of methane in small carbonate particles of a possibly subglacial origin.

This can be of importance when considering the potential methane release from subglacial environments associated with deglaciation. Methane entrapment in sediment/soil could delay the release of the gas and enable gradual oxidation in situ (as opposed to episodic bursts that can reach the atmosphere).

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I have only minor comments and questions:

First, is there any way to examine the particles that could potentially contain the methane to test whether or not they really are of subglacial origin?

Second, the differences in bedrock, and consequently in pH and nutrient concentrations, must have an effect on the microbial community in the sediment/soil. Have any differences been found in the abundance and/or diversity of methanogens (as sources of methane) and/or methanotrophs (as sinks) between the siliceous and the calcareous sediments? This may affect methane concentrations (assuming that the methane is biogenic, of course).

Specific comments:

Page 818 line 2: Glacier forefields are created by glacial melt, not just affected.

P818, l4: "organisms are forced to adapt" is a bit misleading. The subglacial/proglacial transition definitely creates a strong selection pressure, but some organisms simply die out rather than adapt.

P818, l8: . . .little is known of CH4. . .

P821, l9: what is quasi-undisturbed?

P824, l23: correct to 'sonication'

Interactive comment on Biogeosciences Discuss., 10, 14815, 2013.