Comments to Anonymous Referee #1 of „Organic carbon and total nitrogen stocks in soils of the Lena River Delta"

by S. Zubrzycki et al."

Referee #1, general comments:

The information presented in this paper is an excellent example and could serve as a model for the next generation of detailed carbon stock studies. The paper is well written and well organised. I have only one minor comment relating to the lack of any representative soil descriptions and/or photographs. This information should be provided in order to show the types of soils occurring on Holocene terraces and active floodplains. I recommend that the paper be published with minor changes.

We thank the referee for the helpful comments to improve the information on soil types of the described geomorphic units. We agree with the referee and included photographs (Fig. 2) and brief descriptions (Table 1) of representative soil types in the revised version of the manuscript.

Referee #1, detailed comments:

Page 17270, lines 12-14. *I assume that you have stored these four unsampled cores in a frozen state. How did you do manage to keep the cores frozen in the field and during shipping to the lab? Perhaps you will want to comment on this.*

We stored the unsampled cores in a frozen state. The field campaign was performed in April and May when daily mean air temperatures vary between -19 °C and -6 °C (see Fig. 2, discussion paper). Therefore the cores stayed frozen in the field without any special treatment. For the transportation to the home laboratory special EPP (expanded polypropylene) boxes were used with a wall thickness of 60 mm and a volume of 70 L. Within these boxes samples remain frozen for several tens of hours without external energy. The boxes were stored cooled in Tiksi and in St. Petersburg waiting for journey on. Thus, the cooling chain was unbroken during the entire transportation from field in Siberia, Russia to home laboratory in Hamburg, Germany.

Page 17276, lines 8 and 9. *The C% of 0.17-42.46% and 0.13-27.71% probably include both mineral and organic soil horizons. Soils having >17% organic carbon are considered to be organic soils or horizons. It would be better to report the C % separately for organic and mineral soils.*

The reported gravimetric contents of organic carbon c_{OC} include both mineral and organic soil horizons. This co-consideration of both horizons types is caused by the general sampling design orienting on six reference depths (see page 17269 and Fig. 3B, discussion paper) and

not on soil horizons depth. For the later calculation of total pools of organic carbon S_{OC} we considered this differentiation as not obligatory.

Page 17280, lines 13-26. *I do not think it is realistic to compare soil carbon estimates (29.5 kgm-2) for the Lena Delta Holocene terrace to the estimates made by other authors. For example, the estimates reported by Tarnocai et al. (2009) for Turbels and Orthels refer to upland soils, not to soils developed on alluvium.*

This is an important remark because comparisons of permafrost-affected soils from different geomorphic units indeed are not always meaningful. This remark also points out the scarcity of suitable carbon stock estimates for comparison. However, the comparison we made is meaningful due to the characteristics of the Holocene terrace of the Lena River Delta. This terrace which is 10-16 m a.s.l. consists mainly of ice wedge polygons with accumulated organic material mixed with aeolian sediments in their centres and mineral and cryoturbated soils above the ice wedges. Although the regarded soils develop on a river terrace the alluvial influence is negligible and the character of these soils can be described as wet sedge tundra soils.

Page 17282, lines 10-25. *My experience with deltaic soils is that most of the organic matter is brought in by the river and deposited with the alluvium. It is interesting to note that the authors emphasize the lack of vegetation and do not consider the organic matter deposited with the alluvium.*

This very important source of carbon, the allochthonous organic matter deposited on the floodplains was considered in the revised version as suggested by the referee (Page 17282, Line 20-23).