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Interactive comment on “Lena River Delta formation during the Holocene” by D. Bolshiyarov et al.

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Dear anonymous Referee #2, we understand your questions and your doubts about our demonstrations of sea level fluctuations during Holocene. We will try answer your questions. General notes. Discussed article is a first our experience to publish results of the Lena River Delta investigations in English. All previous articles have been published in Russian. And the main our results devoted to Lena Delta formation published in 2013 as a book named after “Origin and development of the Lena River Delta”. In discussing article we could not demonstrate all data which we took from Delta during 15 years of joint Russian-German investigations. In the article we tried to attract attention of investigators to origination of so-called peat in a huge space of the Arctic, not only in the Lena Delta but in many places of Eurasian Arctic coast

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from Svalbard to Chukotka. Nevertheless a so called “peat” is a main object of our article. Main peculiarities of this plant detritus accumulation are anomalous thickness (up to 8-15 meters in the Arctic tundra) and very high speed of accumulation. In our opinion this is a very expressive argument to think that this organic material has not been accumulated in Arctic bogs. Thick organic material composes not only Holocene estuarine terraces but Ice Complex formation too. In both cases there are many aquatic microfossils in these sediments. Sometimes we can find marine organisms in sediments of terraces, sometimes not because terrace could be forms by processes of abrasion. In such case sediments are free from marine organisms. In a case of Lena Delta marine terraces sometimes free from marine organisms because water along sea side of Lena Delta was fresh during sedimentation and terrace formation. Sometimes our predecessors have found and sometimes we found marine organisms in marine, estuarine sediments of terraces. We found them even in the Ice Complex sediments. All these questions discussed in a mentioned book. Volume of article dos’ not permit to discuss all this problems. That is why we often refer to our more spacious publication. Our data about sea-level highstands are not contradicts to well known concepts of the Laptev Sea transgression because these concepts are very narrow and unilateral.. Marine microfossils from sediment cores which investigated by H.Bauch, E. Polyakova, E Taldenkova can fix a time and a place when sea came during transgression only. Microfossils in sediments can not show a depth of the sea with accuracy not more than tens meters. Salinity of waters and other parameters of basin which can be determined with microfossils investigations may be depend on some factors, such as river water fluctuations or sea level changes. That is why investigations of marine terraces on shoreline with sediments studying on the shelf are necessary instruments for sea level fluctuations determination. We used data from some lakes, where marine waters penetrated during sea transgressions in Holocene. Nobody can understand sea level fluctuations without terrestrial investigations of terraces and lake sediments. Specific notes. p.4088 Yes, we used uncalibrated radiocarbon ages because there are many such datings which have been used by

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our Russian colleagues in described region for the first time. There is a second reason why we don't used such ages. We don't believe in rightness of corrections in 14C dating process. Nobody could explain a real physical sense of 14C corrections. And datings is an additional data in our constraction only. In any case (calibrated or uncalibrated ages) we can see a very short time of organomineral sedimentation in Lena Delta. Thank you for remark about designation of radiocarbon age. We have to correct designations. Fig.2. We agree with you that it is not clear what we named by redeposited microfossils. We made the corrections in Figure 2. OsmundĎř also relates to redeposited microfossils. It is difficult to establish the taxonomic composition because of poor preservation of reworked grain. With regard to inexpressivity of pollen diagram we wanted to show that there are no changes in pollen spectra at all stages of sedimentation in estuary, when sediments on the border of the River and the Sea accumulated. Fig. 7. Yes we will change Holocene to Middle and Late Holocen on figure caption. Fig.8 It seems to us, that it is very important to show stages of Lena River Delta Region history before Holocene. We can do it with reference of our book "Origin and development of the Lena River Delta". The main idea that sediments of Holocene terraces and Ice Complex sediments accumulated in similar conditions of sea level fluctuations and freezing of sediments. Ice complex formed in more colder climate only. Thank you for showing small mistakes and as a whole for interest to our investigations. D. Bolshiyarov, A.Makarov, L.Savlieva 23.07.2014

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/11/C3769/2014/bgd-11-C3769-2014-supplement.pdf>

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