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Interactive comment on "Comment on "The origin of methane in the East Siberian Arctic Shelf unraveled with triple isotope analysis", by Sapart et al. (2017)" *by* Katy J. Sparrow and John D. Kessler

Anonymous Referee #2

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The comment by Sparrow and Kessler presents two main criticisms of the Sapart et al (2017) article: 1) There is a lack of detailed descriptions of 14C-related methodology and a possible lack of control and blank tests for the 14CH4 analyses that would be fully representative of all sample handling. 2) The extremely high 14C values observed in some of the samples (up to 9560 pMC) are likely indicative of a 14C-enriched contaminant and associated methodological problems.

After carefully reading the Sapart et al paper (including the supplement), I find both of these criticisms completely valid. The 14CH4 measurement methodology should

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indeed be described in detail, but it is not present in either the main article or the supplement. I also agree with Sparrow and Kessler on the point that fully-representative control and blank tests for the 14CH4 measurements are absolutely imperative for this kind of work, and there is no evidence in the article that such tests were done.

In agreement with Sparrow and Kessler, I also find the Sapart et al hypothesis regarding extremely high 14CH4 values (that this is due to environmental releases of nuclear waste in the region) unconvincing. For the affected sediment core (ID-11), it seems unlikely that pore water movement in the sediments is fast enough to cause such a large 14CH4 enrichment from possible nuclear waste releases that happened only in the last few decades. Further, the largest 14C enrichments are observed for the deepest samples, again inconsistent with a surface nuclear waste source. For the water samples ("shelf edge"), again I find it implausible that nuclear waste releases in this region have affected the more remote (and deeper) waters while not affecting near-coastal waters. Sparrow and Kessler's hypothesis to explain the extreme 14C enrichments (contamination arising from sample processing) seems much more likely.

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