

Interactive comment on “Tracing water masses with ^{129}I and ^{236}U in the subpolar North Atlantic along the GEOTRACES GA01 section” by Maxi Castrillejo et al.

Anonymous Referee #1

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This manuscript focus on the distribution of ^{129}I and ^{236}U along the GEOVIDE section (transect GEOTRACES GA01) in spring 2014. GEOVIDE cruise covered the subpolar North Atlantic Ocean and the Labrador Sea. It represents an important updated dataset and the authors successfully use ^{129}I and $^{236}\text{U}/^{238}\text{U}$ and $^{236}\text{U}/^{129}\text{I}$ atom ratios to describe water masses. The authors confirm with this study the major potential of the combination of ^{129}I and ^{236}U as circulation tracers, especially in the area of study and the Arctic Seas and I really enjoyed reading it.

However, I think that given that the combined use of ^{129}I and ^{236}U provide such rich information, some of the results provided could be discussed in more depth. My

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impression is that the description and overall use of some the data still require a bit of discussion.

If I am not mistaken, the paper have three main objectives that should be emphasized and clarified in the abstract and the introduction.

1. Update and improve the database of ^{129}I and ^{236}U , to be used for future studies and/or modelisation of the ocean circulation in the North Atlantic
2. Present new evidences of the advantages of using both radionuclides as dual tracers in the ocean. In this case, what I miss in the text is a more detailed explanation/introduction of why and how ^{236}U , ^{129}I and $^{236}\text{U}/^{129}\text{I}$ combined provide different and complementary information. The authors reference previous works but should provide the reader with a bit of context and additional information about how these tracers/methodology work.
3. Use the tracers to understand ocean circulation in the area. This seems to be the main objective of the paper, however the conclusions from this part are mixed with the other two objectives, together with what is already known and what is novel in this paper. e.g. the final conclusion in the Abstract “Data of ^{129}I and ^{236}U from 2014 and the ^{129}I time series in the Labrador Sea agrees with the hypothesis that Atlantic Waters follow at least two circulation loops from their source region [...] recirculation in the Arctic Eurasian Basin” is not new was already stated by Orre et al. (2010) with ^{129}I and partially by Povinec et al., (2003) using other radioactive tracers such as ^{137}Cs . But there is missing information in the abstract to emphasize that the other conclusions are indeed novel, i.e contribution of ISOW to eastern SPNA is quite recent.

A general comment on the paper is that it presents an impressive dataset and it would be desirable to make more clear which of the conclusions are confirmations of previous hypotheses/results. In the text it is indeed explained, however I think that the novel results, found mainly from the dual use of these radiotracers, are mixed with results that are confirmation of known facts and its relevance it is not explicitly enhanced,

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which is a shame. Section 3.4 is basically where the novel features of these tracers are presented, in contrast with previous sections that basically use previous data and hypotheses and verify that the new 129I and 236U data are in agreement. However, this distinction is, in my opinion, not totally clear especially when presenting section 3.3. Novel and/or on discussion hypotheses reinforced by these dataset should be highlighted. I would also emphasize conclusions obtained by the use of 236U and 129I/236U, since they are novel tracers and the first time that they are measured simultaneously in the area. However, in this sense I find the Conclusion section very well structured.

Finally, it is assumed in the text that the reader knows well about the ocean circulation in the North Atlantic and Arctic Oceans and about 129I and 236U, if this is the case, the paper is quite straightforward to read. But in my opinion one can get easily lost if that is not the case, I have add a few examples of this in the specific comments below. To provide a general background to better understand the discussion of the results I suggest something like:

1. Presenting first a brief introduction to ocean circulation and water masses involved with the data.
2. Explain in more detail the role of 129I, 236U and 236U/129I as ocean tracers of the SPNA, making clear what we have learn so far using them i.e. provide context. It would be also good to better explain how to read and understand Figure 3. Which is extremely useful and provides a lot of information.

Please also note the supplement to this comment:

<https://www.biogeosciences-discuss.net/bg-2018-228/bg-2018-228-RC1-supplement.pdf>

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2018-228>, 2018.