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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 #2

Received and published: 15 July 2018

In general, this article presents new information about two circulation loops of Atlantic Waters which are tagged with nuclear reprocessing plant effluents from their source region based on the observations at stations from Lisbon (Portugal) to the southern tip of Greenland (Cape Farewell), and from Cape Farewell to St. John's (Newfoundland, Canada). The reviewer thinks that this article should be published in Biogeoscience, but there are several points should be revised before publication.

Major points: Page 8 line 25 The authors used a binary mixing model of which three end members are LB, GF and NRP. But, as the authors recognized and stated in the text, most of the samples can be explained by simple two end members model except

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6 samples collected in the deeper layers (page 9, line 2) which towards the lithogenic background, LB. This means that in the surface to mid depths in this region, to discuss sources of 129I and 236U in the SPNA, the reviewer thinks that it is enough to use simple two end members mixing model and the authors can revise the discuss here.

Page12 Line 1 -27 The discussion about transit times and dilution factors in the paragraph is poor and difficult to understand how the authors calculate time scales of 8-10 years for shorter loop and 8-18 years for longer loop. This 8-18 years statement is also inconsistent the numbers stated “between the maximum 16-8 years (page 13 line 19)” in the conclusion.

The authors used 129I input function at 60 N deg. By Christle 2015 and compared observational peak. But the input function already includes several assumptions and based on the figure caption, no explanation in the main text, the authors expanded the function to fit the measurement. But as shown in Figures 4A and 4B, the reviewer observes inconsistency between input functions and observations for both 129I and 236U. Therefore, the reviewer suggests that the authors can and should collaborate with numerical modeling guys to get modeling results and compared with authors observation.

Minor points: page 2 line 25-29 The authors should add about 238U data in their study.

Page 5 line 25 and 24 12L Niskin bottles.→ and 24 of 12L Niskin bottles.?

Page 7 line 8 The authors used data marked * , but the uncertainties are so large for 236U/238U ratio 129I/236U ratio as 2350+- 370 and 200+-60, respectively. These numbers should be in the blanket ( ), and 2090+-140 and 140+-30 should be used. Due to larger uncertainty, 2350+-370 and 2090+-140 mean within the same and 200+-60 and 140+-30 locate are also within the same.

Page 8 line 3 andc∼ 1600 x . The reviewer can not understand the meaning of this part. Please clarifiy the meaning of this part.

Page 27 Figure4 Caption of Figure 4 is not enough and color coordinations for previous and current date are not good, eg. think open green circle in Fig.4B was hard to find in Fig.4D. Time series data in Fig.4A is also not good to undestand temporal changed of 129I concentration. In general, all figure captions did not contain enough information about meaning of each color and each mark. Please state more precisely.

End of comments.

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