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## ***Interactive comment on “Intense photooxidative degradation of planktonic and bacterial lipids in sinking particles collected with sediment traps across the Canadian Beaufort Shelf (Arctic Ocean)” by J.-F. Rontani et al.***

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This paper describes an interesting investigation into the various degradation pathways of organic matter in sinking particles isolated from sediment traps deployed in the Canadian Arctic. The rationale for the study is clear and the methodology is sound and based on well-established procedures. The presentation of the results, both in the text and the supporting figures/tables is also very clear and data are explained with suitable referencing of previous literature. The evidence for the main outcome of this study, namely the enhanced abiotic degradation of selected organic lipids derived

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from diatoms, is clear and supported by the experimental data. In addition, the inter-relationships between sources (and their lipid signatures), degradation pathways and product identification are well presented. The outcomes from this study will be of interest to scientists studying biogeochemical cycles and of those pertaining to organic matter, in particular.

There are a few cases where there are minor grammatical errors (singular/plural and a few word order inconsistencies), but the article is generally well written.

Finally, the article begins with a rationale for study that includes the potential impacts of climate change on the processing of POM and the influence(s) that reduced sea ice cover may have, in particular. It is a pity, therefore, that this is not re-visited in the conclusions, so that the analytical outcomes (which are very well done) are not then placed in a wider context. Whilst this cannot be achieved definitely given the dataset obtained, and it would be unwise to encourage unhelpful speculation, it would be of interest to at least receive some suggestions of the significance of the outcomes in a wider context. For example, this may take the form of estimating what the impacts of changing oceanographic conditions might have on the preservation of OM in the water column (as alluded to in the introduction with reduced sea ice). Alternatively, the outcomes may be used to highlight the importance of considering selective (and variable) preservation of OM en route to underlying sediments, especially as such archived records are often used in the reconstruction of past climates.

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