

## ***Interactive comment on “Seasonal survey of the composition and degradation state of particulate organic matter in the Rhone River using lipid tracers” by M.-A. Galeron et al.***

**Anonymous Referee #2**

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Review of MS bg-2014-441, “Seasonal survey of the composition and degradation state of particulate organic matter in the Rhone River using lipid tracers” by Galeron et al.

This manuscript couples lipid and lipid degradation byproducts to explore the underlying dynamics to determine the origin of particulate organic matter in a major mixed-use river system. The authors sampled near the river outlet repeatedly throughout the year to explore the seasonal dynamics and change in the source and origin of POM sources.

There is relatively little preexisting work exploring these dynamics using lipids in mixed-use rivers, and the seasonal aspect to this work is particularly valuable. The manuscript

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will be a welcome contribution to the literature after some minor revisions and considerations.

Overall, the manuscript is fairly well written, although it contains some loose and colloquial language and could use some additional tightening. The paper could also be improved by creating a table of lipid tracer names, origins, and associated degradation products discussed in the study. However, these issues are minor, and my two main areas of concern are as follows:

The merit of the manuscript is presenting all of the data available in POM at the Rhone estuary. However, the conclusions made from this information ignores the significant gap in knowledge about the breakdown rates of these byproducts. Since sampling was only conducted at the mouth of the river, diverse breakdown or uptake rates of these compounds may heavily bias the interpretation of these results. The conclusions should be qualified with this concern and discuss the gap in knowledge and its implications.

The presentation and interpretation of fatty acid data is underdeveloped. There is unclear usage of fatty acid nomenclature conventions, particularly in regards to PUFA classifications. This is particularly important due to different potential origins of 16-18 C PUFA in green plants and 20+ C forms only found in algae. See Taipale et al. 2013 regarding fatty acid profiles of various algal groups, and related literature for information about terrestrial plants. PUFA should be considered to be split between 16-18 C and 20+ C forms. In addition, fatty acid profile (percentage relative to sum of all fatty acids quantified) should be considered in the tables instead of simple fatty acid content by weight. More detailed comments are contained as annotations in the attached document.

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/11/C7052/2014/bgd-11-C7052-2014-supplement.pdf>

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