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Interactive comment on “Photomineralization and photomethanification of dissolved organic matter in Saguenay River surface water” by Y. Zhang and H. Xie

Anonymous Referee #2

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This study evaluated photochemical production of carbon dioxide and methane in surface water collected from a tidal section of the Saguenay River, Canada. Water samples with differing levels of dissolved oxygen were filtered to remove bacteria and subjected to medium to long term exposures to simulated solar irradiance. Rates of CDOM photodegradation and rates of gas photoproduction together with apparent quantum yields are presented in a thorough and detailed manner. The manuscript is very well written and describes the work clearly. Methane supersaturation in well-oxygenated surface ocean water is a phenomenon that has been widely observed but remains poorly understood. Previous studies, e.g. Bange and Uher, 2005, have failed to detect methane photoproduction in all but anoxic seawater, so the findings of Zhang and Xie

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are important and should be published. The investigation of DMS as a precursor to methane photoproduction is interesting and it would be nice in future work to also look at O-methylated phenolic compounds found in lignin. My only minor comment is that the authors don't discuss the scale of carbon monoxide photoproduction in the context of DOC photomineralisation, it would be helpful to get some idea of how much carbon could be diverted to CO if the authors have measurements from Saguenay River/St. Laurence Estuary.

Interactive comment on Biogeosciences Discuss., 12, 14303, 2015.

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