

Interactive comment on “Controls on dissolved organic matter (DOM) degradation in a headwater stream: the influence of photochemical and hydrological conditions in determining light-limitation or substrate-limitation of photo-degradation” by R. M. Cory et al.

Anonymous Referee #1

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General Comments: This is a review of "Controls on dissolved organic matter (DOM) degradation in a headwater stream: the influence of photochemical and hydrological conditions in determining light-limitation or substrate-limitation of photo-degradation." This manuscript presents spatial and temporal variations in optical properties of DOM collected from stream water and soil water draining to the creek. The authors take into account the physical stratification of deeper stream "beads" for their quantitative calculations. Laboratory bacterial degradation experiments were also performed on original

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and photo-stimulated samples for use in an estimation of integrated, water column photo-degradation rates. Ultimately the authors present a conceptual model of light versus substrate limitation for streams with predominantly terrestrial DOM. This study is particularly timely as the fate and transport of DOM in areas with thawing permafrost are becoming increasingly important to global carbon cycle estimates and will be of interest to readers of Biogeosciences. This study presents new, quantitative information related to the importance of photochemical processing of DOM in conjunction with microbial degradation to CO₂.

Specific Comments: - Introduction, the introduction is well written and provides a solid background and rationale for the presented study - Methods, the methods used in this study are robust and thoroughly presented - Results and discussion, the results in the text are consistent with the data presented in the tables and figures. The discussion walks the reader through the conceptual model clearly and thoroughly and is well supported with literature. - The word "significant" is used throughout the results and discussion with no p values (or alternative measures of significance) presented. The authors should add in tests of significance or consider revising the text to reflect that their differences are measured, but not tested statistically for significance.

Technical Corrections: - Figures 3 and 4 are tough to read with such a small font. Would it be possible for the authors to increase the size? - Page 9818, line 7, "attention" should be revised to read "attenuation"

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