6-30-2022

Supporting Information for Chromophoric Dissolved Organic Matter (CDOM) Across an Elevational Gradient from Sea Level to Mountain Lakes in the Pacific Northwest

Kyle Juetten
Western Washington University

Angela L. Strecker
Western Washington University

Aaron Harrison
Austin College

Zachary Landram
Western Washington University

Warren J. De Bruyn
Chapman University

See next page for additional authors

Authors

Kyle Juetten, Angela L. Strecker, Aaron Harrison, Zachary Landram, Warren J. De Bruyn, and Catherine D. Clark

Chromophoric Dissolved Organic Matter (CDOM) Across An Elevational Gradient from Sea Level to Mountain Lakes.

Kyle Juetten[1], Angela L. Strecker[2,3], Aaron Harrison[4,5], Zachary Landram[1], Warren J. De Bruyn[4], Catherine D. Clark[1]*

1. Department of Chemistry, College of Science and Engineering, Western Washington University, 516 High St., Bellingham, WA 98229, USA
2. Institute for Watershed Studies, College of the Environment, Western Washington University, 516 High St., Bellingham, WA 98229, USA
3. Department of Environmental Sciences, College of the Environment, Western Washington University, 516 High St., Bellingham, WA 98229, USA
4. Chemistry and Biochemistry program, Schmid College of Science and Technology, Chapman University, One University Drive, Orange, CA 92866
5. Department of Chemistry, Austin College, 900 N. Grand Ave., Sherman, TX 75090

Description

This dataset is in support of Juetten et al., which has been submitted to the Journal of Geophysical Research Biogeosciences for consideration for publication. Chromophoric dissolved organic matter (CDOM) in lakes across elevation gradients is a complex function of topography, climate, vegetation coverage, land use, and lake properties. To examine sources and processing of CDOM from sea level to mountain lakes (3 to 1574 m), we measured CDOM optical properties, lake characteristics, and water quality parameters in 62 freshwater lakes in the Pacific Northwest, USA. Higher elevation lakes had lower dissolved organic carbon (DOC) and

absorbance. These lakes had higher forest cover, minimal wetlands or crops, low nutrients, cooler water temperatures, and low chlorophyll *a*. Two humic-like and one protein-like fluorescent component were identified from excitation-emission matrix spectroscopy (EEMs). The index of recent autochthonous contribution (BIX), fluorescence index (FIX) and S_R optical indices indicated that most lakes were dominated by terrestrially-derived material. The humification index (HIX) and specific ultra-violet absorbance (SUVA) were consistent with more aromatic humic CDOM at lower elevations. Fluorescence of humic-like components was lower at higher elevation, indicating reduced amounts of CDOM, attributed to lower inputs from vegetation. The relative contribution of the protein-like component increased at higher elevation, because allochthonous terrestrial inputs are reduced relative to in situ production of autochthonous material or higher photochemical and biological degradation of allochthonous material. Differences in optical characteristics associated with CDOM levels and some characteristics associated with CDOM source and quality were observed across the elevational gradient. These differences were driven by characteristics at both within-lake and watershed scales, suggesting a more complete understanding of CDOM patterns can be gained by examining factors at multiple spatial scales.

The dataset available below is supplementary information to the paper in a Word file format. This includes: a figure corresponding to the RDA Figure 6 in the manuscript giving the lake names; a table giving sampling dates, elevations, locations and watershed characteristics for the lakes; a table comparing water quality parameters for deep vs, surface water samples from Lake Padden in 2011; and a table giving the measured water quality parameters for the lakes from summer 2018.

Keywords: DOM; lakes; EEMs; absorbance; DOC; CDOM