

GLEON
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Book of Abstracts



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Do years with different ice-out dates influence pelagic and littoral metabolism in a lake?

Facundo Scordo¹, Sudeep Chandra¹, Noah R. Lotting², Joshua Culpepper^{1,3}, Suzanne J. Kelson¹, James Simons¹, Edward M. Krynak¹, Carina Seitz^{4,5}, Erin Suenaga¹

^{4,2} Global Water Center, Department Of Biology, University Of Nevada, Reno, Reno, NV, USA

² University Of Wisconsin Center For Limnology, Trout Lake Station, Boulder Junction, Wisconsin University, WI, USA

³ Division Of Hydrologic Sciences, Desert Research Institute, Reno, NV, USA

⁴ CONICET – Instituto Argentino De Oceanografía, Bahía Blanca, Buenos Aires, Argentina

⁵ Departamento De Geología, Universidad Nacional Del Sur, Bahía Blanca, Buenos Aires, Argentina

The duration of winter ice cover plays a key role in lake metabolism. We analyzed metabolism rates in a littoral (L) and pelagic (P) habitats of a subalpine lake using a metabolism model based on free-water dissolved oxygen during years with early, middle, and late ice-out dates. Gross primary production (GPP) and respiration (R) at L was up to 7.8 and 5.5 times, respectively, higher than at P. GPP and R in both sites was lower during the years with early ice-out (P = 30%, L= 35% decrease) and late ice-out (P = 30%, L= 61% decrease) compared to middle ice-out years. Also, both sites exhibited lower R during the years with early ice-out (P = 26%, L= 41% decrease) and late ice-out (P = 32%, L= 46% decrease). Finally, middle values of net ecosystem production (NEP) were positive during more than 80% of the period analyzed, indicating autotrophic-dominated lake metabolism with one exception in L. In the late ice-out year, L had a negative middle value of NEP during 97% of the analyzed period, showing a shift to heterotrophic metabolism. This study demonstrates how metabolic rates change in different habitats of the lake in years with different ice-out dates. Low heat content on the lake and wash of nutrients and producers late in the ice-free season may have reduced the metabolism during the year with late ice-out. The depletion of nutrients and high grazing rates could have reduced metabolism during the year with early ice-out.