



New organic matter degradation proxies: Valid in lake systems?

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ABSTRACT: We determined concentrations and diagenetic state of organic matter in two cores from Lake Zug, Switzerland. To obtain a general picture of organic matter decay in the lake, we measured bulk parameters such as total organic carbon, total nitrogen, and total hydrolyzable amino acids. In addition, we studied specific compound classes in detail—namely, amino acids and chlorins. From these data we obtained two recently proposed indicators for organic matter degradation state—the amino acid-based degradation index (DI) and the chlorin index (CI). The two indicators complement each other, with the CI being very sensitive during the initial stages of organic matter decay and the DI recording later stages of decay. Further differences are likely caused by nonlinear behavior during degradation. Nonetheless, the two proxies agree in the general picture of the degradation state. Despite higher concentrations of organic matter in the surface sediment at the deeper site, neither of the degradation state indicators showed much difference between the two sites. At depth, the degradation state at the two sites diverges, despite similar concentrations of organic matter. Although we cannot explain all differences between bulk parameters, amino acid composition, and chlorins conclusively, the results indicate a combined effect of different organic matter inputs (e.g., through sediment focusing) and different oxygen availability at the two sites since the onset of eutrophication.

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