Public Abstract
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Title:Organic Matter Remineralization in the Sediments of Two Acid Mine Drainage Lakes

Acid mine drainage (AMD) is a significant environmental problem throughout the world. At the Rocky Forks Conservation Area near Columbia, MO numerous lakes have formed from old coal mining pits. Most of these lakes have a pH near 7, presumably buffered by the limestone bedrock. One though, which was nicknamed Red Lake, is consistently acidic. A comparison study was done from July 2012 to January 2013 between Red Lake (pH 3.4) and its neighbor, Green Lake (pH 7.4) to determine the rate at which organic matter is remineralized in the sediments of both lakes.
Pore water equilibrators were inserted into the sediments of both lakes to obtain concentration depth profiles of ferrous iron (Fe^{2+}), sulfate (SO_4^{2-}), manganese (Mn^{2+}), and dissolved inorganic carbon (DIC) in order to model rates. Results showed Red Lake had significantly higher Fe^{2+}, Mn^{2+}, and SO_4^{2-} concentrations in the pore water than Green Lake. Iron and sulfate reduction occurred in both lakes, but manganese reduction was not observed in either. Sulfate reduction predominated in Green Lake, which resulted in higher rates of DIC production than in Red Lake. Iron reduction was observed in Red Lake for the summer months, but does not account for a majority of DIC produced. In the winter, sulfate reduction is observed deeper in the sediment column accounting for 100% of the DIC produced in Red Lake. However, plants, organic matter, and iron cycling may be altering iron and sulfate reduction and the biogeochemistry in Red and Green Lakes, accounting for differences in DIC production rates between the two lakes.