

## Using oxygen isotopes of phosphate to trace phosphorus sources and cycling in Lake Erie

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### ABSTRACT

Water samples collected during three sampling trips to Lake Erie displayed oxygen isotopic values of dissolved phosphate ( $\delta^{18}\text{O}_p$ ) that were largely out of equilibrium with ambient conditions, indicating that source signatures may be discerned.  $\delta^{18}\text{O}_p$  values in the Lake ranged from +10‰ to +17‰, whereas the equilibrium value was expected to be around +14‰. The riverine weighted average  $\delta^{18}\text{O}_p$  value was +11‰ and may represent one source of phosphate to the Lake. The lake  $\delta^{18}\text{O}_p$  values indicated that there must be one or more as yet uncharacterized source(s) of phosphate with a high  $\delta^{18}\text{O}_p$  value. Potential sources other than rivers are not yet well-characterized with respect to  $\delta^{18}\text{O}$  of phosphate, but we speculate that a likely source may be the release of phosphate from sediments under reducing conditions created during anoxic events in the hypolimnion of the central basin of Lake Erie. Identifying potential phosphorus sources to the Lake is vital for designing effective management plans for reducing nutrient inputs and associated eutrophication.

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