

COUPLING MERCURY, LEAD, AND STRONTIUM ISOTOPES IN ARCHIVED GREAT LAKES PRECIPITATION SAMPLES TO IMPROVE POLLUTANT SOURCE APPORTIONMENT WITH NEW AND NOVEL TECHNIQUES

The U-M Water Center engages researchers, practitioners, policymakers, and non-profit groups with the goal of supporting, integrating, and improving current and future restoration and protection efforts.

The grants program is an important part of the Water Center's efforts to enhance restoration and protection activities by engaging exceptional multi-sector teams in advancing evaluation and assessment of restoration projects.

FOR MORE INFORMATION

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Project Summary

Atmospheric deposition of hazardous pollutants such as mercury and lead to the Great Lakes Region is of significant concern to human and environmental health. In fact, all of the water bodies in the area currently have fish-consumption advisories due to high concentrations of mercury in fish. It is often difficult, however, to directly link pollutant emission sources, such as coal-fired power plants, with impacted areas.

This project will measure mercury, lead, and strontium isotopes in previously collected rainfall samples across the Great Lakes Region to develop a new method to "fingerprint" emissions of these metals. Recent studies suggest that emissions from sources such as coal-fired power plants, metal smelters, and waste incinerators display different isotopic compositions (i.e., different ratios of the masses of a given element). However, multiple isotopes have not yet been utilized together to fingerprint these emissions. This novel method will provide a powerful tool to link emission sources with impacted sites across the Great Lakes Region. In addition, by utilizing archived precipitation samples collected in conjunction with previous Great Lakes projects, the results of the study can be compared with previous analyses. This approach will not only strengthen the power of the results, but also enable an evaluation of the potential future application of these novel techniques by scientists and regulators. Finally, comparison of these archived rainfall samples with future rainfall samples may enable assessment of the effectiveness of recent emissions regulations such as the U.S. EPA Mercury and Air Toxics Standards.



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