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## Using detrital zircon geochronology to understand Indiana's glacial history

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While there is evidence that northern Indiana was covered by glaciers during the Last Glacial Maximum, the absence of well-defined glacial landforms over much of the state indicating flow direction and complex moraine systems complicates our ability to determine ice flow paths. Reconstructing ice flow paths is important for understanding and modeling past ice sheet behavior and can also be useful in understanding the distribution of

naturally-occurring chemical elements such as arsenic. Based on the success of using detrital zircon geochronology as a provenance tracer in Antarctica, our research group has started investigating its success as a means to understand ice flow paths in Indiana. A pilot study of a single sample from the Michigan, Huron-Erie, and Saginaw Lobes indicates that the distribution of detrital zircon ages are not distinctly different even though, based

on current ice-flow path models, the lobes originate from regions of the Canadian Shield with different bedrock ages. The ages in the tills have similarities to age distributions in Michigan Basin rocks suggesting that the sand-sized fraction of the till may be derived from some combination of underlying till and sedimentary bedrock versus being derived directly from Shield rocks. This has implications for understanding transport

distances of glacial debris and recycling of older tills into younger deposits. Additional analyses are currently being conducted to expand this pilot study and test whether zircon age populations are consistent through time and space for a particular lobe and whether sediment is recycled between successive glacial advances.