

Can we use Arctic rivers to detect permafrost thaw?

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Permafrost soils contain a vast stock of mineral elements and organic carbon. With ongoing climate change there is a pressing need to identify tools that can be used to monitor processes in permafrost soils and detect the effect of warming on the mineral element and organic carbon pools. Arctic rivers capture waters that have had direct contact with permafrost soils suggesting that river constituents could be used to detect changes occurring upon permafrost thaw. The mineral elements and organic carbon that are transported to rivers span a range of size and composition. Here we use in-field size separation and non-traditional metal isotopes to connect these fractions in rivers to processes occurring across the permafrost landscape. Examples of these tools-at-work will be presented for a large Arctic river and a headwater stream.