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# Accounting for instream lakes when interpolating stream water chemistry observations

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## Abstract

Direct monitoring of stream water chemistry is an increasingly important tool for securing stream water quality and assessing stream ecological functioning as it relates to overall ecosystem health. Such monitoring is often discontinuous in spatial extent and, thus, needs to be interpolated at unsampled locations if the desired end product is a continuous map of stream water chemistry. Recently there have been major advances in the use and development of geostatistical methods (such as kriging) for interpolating between observations of stream water chemistry within stream networks. This study investigated the influence of distance definition on interpolation of synoptically collected stream water chemistry samples. In particular, we developed a new methodology for adjusting instream distances between stream water chemistry observations such that instream lakes (which are ubiquitous in northern, boreal landscapes) are explicitly accounted for in geostatistical interpolations. The methodology developed was tested using stream chemistry data for five different constituents coming from synoptic sampling campaigns conducted across four boreal Swedish catchments during two distinct seasons. The ability of this new, lake adjusted instream distance (LAID) to produce interpolated maps of stream water chemistry was compared to that of traditional Euclidean distance (ED) and instream distance (ID). The results indicated that using LAIDs in this boreal landscape tended to improve interpolation compared to the other distance definitions considered. The grade of improvement, however, tended to vary between the constituent, watershed and season considered suggesting that the influence of instream lakes on water chemistry is quite variable in this landscape throughout the year.

## Keywords

synoptic sampling; stream networks; geostatistics; kriging; stream water chemistry

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## Refbacks

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