From the lake concentrations calculate the amount of degraded tracer for a range of WRTs to estimate the mixed concentration of tracers in the discharging groundwater. Relate these estimates with measured groundwater concentrations to find a maximum WRT.

Possible groundwater discharge sites are incorporated in the CATS model together with estimates of the mixed inflowing tracer concentration related to a range of possible WRTs. The model isolates the least number of sites that can explain the measured tracer concentration in the lake and the fraction of discharging groundwater water each site is expected to deliver to the lake.

Collection of water samples from the lake and groundwater wells close to the shore. The groundwater samples are filtered through a GF/F filter to remove particles.

Determine the concentrations of the chosen tracers in the samples.

Choose a conservative tracer and incorporate it into a hierarchical Euclidean dendrogram to isolate sites that receive lake water.

Split the dataset into groundwater recharge sites and possible groundwater discharge sites.

Isolate one or more tracers that are not afflicted in the lake–groundwater interface while still being affected by natural degradation over time.

Incorporate the tracer/tracers into a hierarchical Euclidean dendrogram to isolate sites that resemble the lake and indicate low retention time in the soil, e.g. high recharge rate.

Possible groundwater discharge sites are incorporated in the CATS model together with estimates of the mixed inflowing tracer concentration related to a range of possible WRTs.

Find appropriate degradation models for the desired tracers related to the lake type and catchment area.

Data preparation

Analysis

Results

High flow-rate recharge sites
A cluster of the sites that show a tendency towards high groundwater discharge rate

Groundwater recharge sites
A cluster of the sites that resemble the lake concentration

Groundwater discharge sites
A combination of sites that can explain the tracer concentration in the lake

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