

Assessing groundwater nitrate exposure to world populations and implications for health risks

Department: Earth Sciences

Research group: Geochemistry

Supervisor: Junjie Wang & Jack Middelburg

Email address: j.wang3@uu.nl; j.b.m.middelburg@uu.nl

Project description

Today, surface water and groundwater are equally important as global drinking water supplies. While a very first assessment of the surface-water nitrate exposure to world populations and its spatio-temporal changes since 1970 with decades of human activities has been presented in the latest publication of our group (Wang *et al.*, 2023, *ES&T*, <https://doi.org/10.1021/acs.est.3c06150>), the long-term trajectory of groundwater nitrate exposure and associated potential health risks to humans in different world regions is imperative but lacking. Groundwater, which provides half of the current global drinking water supply, is often reported to be contaminated with nitrate. However, the lack of spatial and temporal data on groundwater importance in drinking water and associated nitrate concentrations adds challenges to gaining a better understanding of groundwater exposure towards a comprehensive assessment of drinking-water nitrate exposure. Recently monitoring efforts have enabled more availability of groundwater nitrate data, and the groundwater contributions to drinking-water supply in different regions are also reported in individual regions, countries, or provinces. It is imperative to collect and compile these important data into a new database for further analysis of groundwater nitrate exposure to fill in the gap in our understanding of planetary health.

The assistant is supposed to:

1. extensively collect the data of (a) the proportions of groundwater use in drinking water supply and (b) groundwater nitrate concentrations at different locations and times worldwide, from measurement datasets, scientific publications, governmental reports., etc., and compile them into a new database.
2. prepare a report of 1000 words of the preliminary analysis of the data trends.
3. be involved in a co-authored peer-reviewed publication (if desired).

The Bright Minds student will have frequent (at least weekly) contact with the supervisors, in person or online.

Job requirements

Basic understanding of nitrate, groundwater and drinking water, literature searching and summary, and data exaction, compilation and preliminary analysis.