

MADELEINE S. BOHLIN - SHORT CV

Department of Earth Sciences
Uppsala University
Villavägen 16, 752 36 Uppsala
madeleine.bohlin@geo.uu.se
+46 (0)793 412 117

Current research projects

- The effect of sediment-water interaction on the Ni isotope budget in the Hooghly (Ganga) River estuary, in collaboration with Emily Stevenson and Helen Williams (University of Cambridge), and Tarun Dalai (IISER Kolkata)
- Li isotope systematics in Swedish river catchments
- Ni isotope fractionation during Fe-(hydr)oxide precipitation, in collaboration with Anna Neubeck (Uppsala University), Ryoji Tanaka and Eizo Nakamura (University of Okayama)
- Tracing continental weathering processes using the stable isotopes of Li and Mg with focus on the Himalayan mountains and the Gangetic floodplain
- Reactive transport modelling of Li, Si and Mg during chemical weathering
- Li isotopes of carbonates as a marine pH proxy, in collaboration with Joji Uchikawa (University of Hawaii at Manoa), Sambuddha Misra (IISER Bangalore), Oscar Branson (University of Cambridge)

Academic record

Researcher, Department of Earth Sciences, Uppsala University, Sweden (October 2019-present)

- **Marie Skłodowska-Curie Individual Fellow** (Oct 2019 – Aug 2023; 50%)
 - *DEstiNi: Investigation of the Dynamic Estuarine and Marine cycling of Nickel*
 - With 6 month placement at the Institute for Planetary Materials at the University of Okayama in Misasa, Japan
- **SGU funded grant** investigating controls on Li isotopes in Swedish river catchments (Jan 2021-Dec 2023)

Postdoctoral Researcher, Department of Earth Sciences, University of Cambridge, UK (2017-2019)

- Reactive transport modelling of Li, Si and Mg in continental weathering environments
- Li isotope systematics during inorganic calcite precipitation

Doctor of Philosophy, Department of Earth Sciences, University of Cambridge, UK (2013 – 2017: Doctorate awarded on the 19th of May 2018, with no corrections to thesis)

Thesis title: ***Chemical weathering in the Himalayas: constraints from the Li isotopic composition of river systems.***

Supervisor: Prof. Mike Bickle

Early Stage Researcher of the Marie Skłodowska-Curie Initial Training Network iTECC (investigating Tectonism, Erosion Climate Couplings). I investigated controls on silicate weathering using lithium (Li) and magnesium (Mg) isotope ratios in river waters and sediments, with focus on catchments in the Himalayan mountain range. I modelled the data using a 1-dimensional reactive-transport model, which quantifies the combined effects of fluid fluxes and advective transport, rock dissolution and secondary mineral formation in the weathering environment. I developed a new analytical method for trace level separation and analysis of Li and Mg, consuming one to two orders of magnitude less sample mass (>0.5ng Li), with equal or better precision than previous methods. I fully organised my field work (planning, logistics and execution) to the Garhwal Himalayas (India).

Master of Science degree, Department of Earth Sciences, Stockholm University, Sweden (Sept 2011 – June 2013)
Thesis title: ***One-dimensional modelling of stable isotopic chemical profiles across a marble layer on Naxos, Greece.***

Supervisor: Prof. Alasdair Skelton

I modelled metamorphic fluid flow using oxygen and carbon isotopic profiles with advective-diffusive and reactive-transport models across lithological boundaries on the metamorphic core complex on Naxos, Greece. The study added constraints on the mechanism and timing of the Miocene prograde metamorphic fluid flow event.

Bachelor of Science degree, Department of Earth Sciences, Uppsala University, Sweden (Sept 2008 – June 2011)

Thesis title: **High-temperature geothermal systems in Iceland.**

Supervisor: *Prof. Valentin Troll*

Literature study on the effect of different heat sources on the mineralogy, hydrology and geochemistry of fluids at high-temperature geothermal fields on Iceland.

Analytical expertise

- **Clean laboratory expertise:** Ten years of clean laboratory experience including general lab use and maintenance, distilling acids, cleaning lab ware for trace element analysis, dissolving rock and sediment samples by bombs and hot plate digestion, sediment leaching for exchangeable-, carbonate – and silicate fractions, HF trained
- **Cation exchange chromatography:** Developed method for separation of trace level concentrations of Li and Mg from natural samples with only one column elution, allowing rapid sample throughput and low cumulative blanks. I separate down to 0.5 ng Li, yielding ~1-70 µg Mg for most natural samples.
- High-precision isotope ratio measurements of **Li, Mg, B** by **MC-ICP-MS** (Neptune Plus): Developed method to analyse small masses of Li (<0.5 ng per duplicate sample analysis) utilising 10^{13} Ω amplifiers.
- **Ni isotope** analysis by MC-ICP-MS (Neptune Plus and Nu Plasma III) utilising double spike method.
- Trace element analysis by **ICP-MS** (ElementXR)
- Major cation analysis by **ICP-OES** (Agilent)

Fellowships, Grants and Awards

- **SGU research grant** 2021 (2 193 796 SEK)
- **Marie Skłodowska-Curie Individual Fellowship** 2019 (€191,852)
- **Joint research grant** 2019 at the Institute for planetary materials, Okayama University (£2000 travel grant, £4000 analysis grant)
- **Geological society of London** Best student presentation award 2016 (£100)

Field campaigns

- **Field expertise:** river water and sediment sampling and filtration, suspended sediment depth sampling, measure river velocity and discharge by Acoustic Doppler Current Profiling (ADCP), alkalinity titrations, in-field pre-concentration of trace elements using Fe-co-precipitation
- **Ganges (Hooghly) estuary, India, April + June 2019** – Collected river waters, bank sediments and suspended sediments from the Ganges estuary across the salinity gradient. Trained Indian PhD students (from IISER Kolkata and IISc Bangalore) how to collect samples
- **Nepal, July 2018** – Collected river waters, bank sediments and suspended sediment depth profiles from major rivers in Central Nepal, ADCP, sediment backscatter, Fe-co-precipitation for pre-concentration of trace elements
- **Nepal, July 2015** – Sampling an east-west transect of large Nepalese rivers at their outflow to the floodplain following the 2015 Ghoroka Earthquake. Collected river waters, suspended sediment depth profiles and bank sediments. Measured river discharge and velocity using ADCP
- **Garhwal Himalayas, India 2014** – fully organised and led a 3 week campaign sampling river water, suspended and bank sediments along a transect across the Himalayan mountain range