

Project acronym: DYNAMO

Project title: Dynamic stream flow impacts on hyporheic and riparian contributions to reach-scale microbial activity

Project leader: Nicolai Brekenfeld, University of Birmingham, UK

Discipline: Earth Sciences & Environment

Station(s): Svartberget Research Station, Sweden

The contribution of the hyporheic and the riparian zone to the reach-scale metabolic activity under varying discharge conditions is proposed to be quantified. Different bed forms will be grouped into clusters (steps, runs, pool-riffles, dunes, bars) and equipped with multi-level piezometers for taking hyporheic and riparian water samples.

Whole-reach constant-rate 'smart' tracer injections (Resazurin transforming into Resorufin under aerobic microbial activity) will be conducted and the breakthrough curve observed in the hyporheic and riparian zone. The transformation of Resazurin to its daughter product Resorufin will be quantified (spectrofluorometrically) and is an estimate of the aerobic microbial activity. The whole-reach tracer injections will be repeated under several, different discharges, produced by blocking the stream (the water will be held back in an upstream lake) or using a large pump to produce medium and large, constant flood pulses.

With this proposed research plan, we will be able to quantify the microbial activity of the specific bed forms and are able to upscale it to the reach scale and compare it with the total reach-scale microbial activity under dynamic discharge conditions. The research is going to be conducted in a small headwater boreal stream (Svartberget Research station), directly downstream of a lake, which is going to be used as a reservoir.