

FORFUS-RT1.4

PhD project on stream carbon export from forested catchments, part of the "Forest function under stress" doctoral training unit (FORFUS)



Inspiration

In the current context of declining forest health, forest carbon (C) uptake and stocks are expected to decline due to an increase in tree mortality and autotrophic respiration. However, it remains unclear whether the amount of terrestrial C stock exported through runoff (mainly as CO₂ and dissolved organic carbon (DOC)), which represents a significant fraction of the annual C balance of headwater catchments, and the underlying processes will also be altered. This is because a clear assessment of the sources of CO₂ and DOC, the related biogeochemical pathways and the associated timescales are still to be fully resolved.

Innovation

In the FORFUS-RT1.4 project, we will investigate how C export, its sources and biogeochemical pathways change under drought conditions in a forested headwater catchment in Luxembourg. The work will be carried out in the Weierbach catchment, where the water fluxes and physico-chemical parameters of soil, ground and stream water are intensively monitored. Water sources will be sampled for a radiocarbon (¹⁴C) characterization of CO₂ and DOC, and particulate matter for C and nitrogen stable isotope analyses. The DC will be involved in the rain exclusion experiment in collaboration with FORFUS-RT1.2.

Impact

The scientific knowledge generated in this project will help determine the effect of drought and heat-related forest decay on stream carbon export.

Partners

University of Luxembourg (LU) , Administration de la nature et des forêts (LU) , Swedish University of Agricultural Sciences (SWE) , Ville de Luxembourg

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