Proposal for 1st Collaborative European Freshwater Science Project for Young Researchers ("FreshProject")

Assessing CO_2 Fluxes from **Euro**pean **Run**ning Waters

– EuroRun –

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ABTRACT

Most inland waters are known to emit large amounts of carbon dioxide (CO2) to the atmosphere. Recent CO2 flux estimates suggest that running waters are major CO2 emitters, accounting for approximately 70% of the total flux from inland waters. However, the magnitude and mechanisms of these fluxes are still not adequately quantified or understood, contributing to a high uncertainty in upscaling approaches. As regional CO2 fluxes are important for our understanding of the global carbon cycle and greenhouse gas balances, we aim to assess seasonal and annual CO2 fluxes from European running waters at multiple locations with a team of early career scientists from all over Europe. The focus of the proposed project EuroRun is laid on estimating CO2 fluxes from European running waters and thus represents the first coordinated European-wide study to examine fluvial CO2 fluxes. The extended team allows comparing seasonal and diurnal fluvial CO2 fluxes but also differences between Northern and Southern Europe.

The measurements will be conducted with drifting flux chambers equipped with mini-loggers to continuously measure CO2 in the chamber headspace. This is a straight forward and inexpensive method for direct measurements of CO2 fluxes which can be easily replicated in space and time. In the frame of the project, the participants will meet for a workshop where they build the flux chamber, learn how to measure as well as analyze the data correctly. Following this, participants will conduct the measurements in their home country in different running waters within coordinated periods and at day and night. Thereby, a unique dataset will be generated that will allow us to make estimations on CO2 fluxes from European running waters.

The proposed project EuroRun is original and innovative in terms of the topic as well as the methodological approach. EuroRun aims towards a better estimation and understanding of riverine CO2 fluxes and their underlying mechanisms, as well as improving current regional and global carbon budgets. A successful execution of the proposed project is given through (i) a joint workshop for the construction of the standardized flux chamber for the participants, (ii) the knowledge and network of the proposing investigators, and (iii) the simple yet robust application of the CO2 flux measurements. The joint workshop also gives the opportunity to personally meet and strengthen collaborations among early careers limnologists. EuroRun feeds from the establishment of a strong collaborative environment and the development of synergies between early career European researchers. EuroRun can only be conducted with the united power of early career European researchers, thus gathering together all the ingredients to be a successful 1st Collaborative European Freshwater Science project for Young Researchers.