

Understanding high-frequency water quality dynamics in rivers draining diverse catchments

My research focuses on long-term high-frequency water quality data (phosphorus, nitrate, turbidity, specific conductivity, dissolved organic carbon) from diverse rivers and streams in agricultural catchments. I am interested in how different catchments release pollutants at an event scale, with a focus on identifying and understanding the underlying biogeochemical processes and drivers. For this purpose, datasets of spatially and climatically diverse catchments situated in various countries within Europe are analysed using machine learning approaches. These allow us to determine the relative importance of individual drivers shaping the water quality response of catchments, ultimately improving our understanding of catchment functioning. In addition, catchments equipped with multiple high-frequency sensors along the stream network and within different hydrologic regions (riparian zone, hyporheic zone, stream) are set up to explain how the contributions of each zone change under varying hydroclimatic conditions. Furthermore, methods to indirectly derive pollutant concentrations by finding appropriate proxies are investigated, aiming to advance water quality monitoring.