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30 years of research in ecosystem ecology, driven by curiosity, grand challenges and opportunities

How to summarize 30 years of research? A challenging task, but as is science. Early on, ecosystems were my objects of research, and they stayed in the focus ever since. From questions how ecosystems responded to N deposition and what the fate of this N within the system was, to questions how terrestrial ecosystems from the boreal zone to the tropics function in terms of their biogeochemistry and biosphere-atmosphere exchange, to questions how climate change, biodiversity loss, and land use affect those processes on the systems scale, the breadth of my research topics over these 30 years has been large. The choice of these topics has always been driven by curiosity and the ambition to work on grand challenges, contributing to science-based, sustainable solutions using observations and experiments. This also meant leaving my comfort zone of existing knowledge of facts, techniques, and ecosystems, challenging at times, but always rewarding. Complementing classical ecological methodology with those from micrometeorology and stable isotope applications opened new windows on those ecosystem processes, offering insights at different time scales, from 20 Hz to centuries. Working with great group members and incredible colleagues in small, national to big, international projects further sparked ideas, taken up in projects, publications or awaiting the reviewers´ decisions.

The Swiss FluxNet, a network of six long-term ecosystem flux measurement sites, is the base of many projects. We quantify greenhouse gas fluxes and their drivers for three major land-use types in Switzerland, i.e., cropland, grassland, and forest. Up to now, we have 111 site-years of flux data, all openly available, ranging from CO_2 and H_2O vapour fluxes from a cropland with the 2nd longest time-series globally to CH_4 and N_2O fluxes of grassland and forest at different elevations. Measurements on soil carbon stocks, vegetation phenology, plant ecophysiology or remotely sensed proxies complement these flux studies. In this talk, selected highlights of past and on-going research will be presented.