



CO₂ and CH₄ fluxes of contrasting pristine bogs in southern Patagonia (Tierra del Fuego, Argentina)

Wiebke Münchberger (1), Christian Blodau (1), Till Kleinebecker (1), and Veronica Pancotto (2)

(1) Institute of Landscape Ecology, University of Muenster, (2) Centro Austral de Investigaciones Científicas (CADIC)

South Patagonian peatlands cover a wide range of the southern terrestrial area and thus are an important component of the terrestrial global carbon cycle. These extremely southern ecosystems have been accumulating organic material since the last glaciation up to now and are – in contrast to northern hemisphere bogs – virtually unaffected by human activities. So far, little attention has been given to these pristine ecosystems and great carbon reservoirs which will potentially be affected by climate change. We aim to fill the knowledge gap in the quantity of carbon released from these bogs and in what controls their fluxes.

We study the temporal and spatial variability of carbon fluxes in two contrasting bog ecosystems in southern Patagonia, Tierra del Fuego. Sphagnum-dominated bog ecosystems in Tierra del Fuego are similar to the ones on the northern hemisphere, while cushion plant-dominated bogs can almost exclusively be found in southern Patagonia. These unique cushion plant-dominated bogs are found close to the coast and their occurrence changes gradually to Sphagnum-dominated bogs with increasing distance from the coast. We conduct closed chamber measurements and record relevant environmental variables for CO₂ and CH₄ fluxes during two austral vegetation periods from December to April. Chamber measurements are performed on microforms representing the main vegetation units of the studied bogs. Gas concentrations are measured with a fast analyzer (Los Gatos Ultraportable Greenhouse Gas Analyzer) allowing to accurately record CH₄ fluxes in the ppm range.

We present preliminary results of the carbon flux variability from south Patagonian peat bogs and give insights into their environmental controls. Carbon fluxes of these two bog types appear to be highly different. In contrast to Sphagnum-dominated bogs, cushion plant-dominated bogs release almost no CH₄ while their CO₂ flux in both, photosynthesis and respiration, can be twice as high as for Sphagnum-dominated bogs. Water table fluctuations in the cushion plant-dominated bog seem to be negligible and CH₄ is mainly released from Sphagnum lawns suggesting the importance of the vegetation type for CH₄ fluxes in these special ecosystems. Our results will help to understand which conditions favor the development of either a cushion plant-dominated or Sphagnum-dominated bog which is not yet known.