



## **The spatial and temporal dynamics of carbon dioxide fluxes from a continental Canadian wetland-pond system**

Marcel Schmiedeskamp (1,2) and Christian Blodau (1)

(1) Ecohydrology and Biogeochemistry Group, Institute of Landscape Ecology, University of Münster, Germany (christian.blodau@uni-muenster.de), (2) School of Environmental Sciences, University of Guelph, Canada

Due to their high number, small continental ponds are often an important and significant source of methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>) on the landscape scale. Until now, only little is known about temporal and especially spatial dynamics of carbon fluxes of a temperate wetland-pond system yet. We determined the CO<sub>2</sub> fluxes in one of this systems (847 m<sup>2</sup>) in southern Ontario, Canada, along a high spatial resolution transect of seven sites and high temporal resolution (10 min interval) continuously over the complete summer of 2015, using measurement units in closed chamber based on small ELG CO<sub>2</sub> loggers (SenseAir), which detect CO<sub>2</sub> by non-dispersive infrared (NDIR) spectroscopy, and using one NDIR sensor in a water impermeable, gas permeable membrane deployed under water. All sites showed a net source of CO<sub>2</sub> to the atmosphere, but they showed spatial differences in size of fluxes amounting from 16.73 (-14.48 to 124.52) mmol CO<sub>2</sub> m<sup>-2</sup> d<sup>-1</sup> to 80.45 (-2.44 to 210.65) mmol CO<sub>2</sub> m<sup>-2</sup> d<sup>-1</sup>. At all sites the CO<sub>2</sub> fluxes decreased significantly in fall, it can be explained by a correlation with radiation and wind. Due to the wind, there is an increased release and stock emptying. The spatial differences are mainly explained by the groundwater dynamics, which have a rising effect on the carbon fluxes. This study shows the large spatial variability of CO<sub>2</sub> at the peatland-pond system and the importance of the spatial differences in determination of CO<sub>2</sub> fluxes for a complete system, which should not be ignored in order to estimate the correct amount of greenhouse gases to the atmosphere.