Geophysical Research Abstracts
Vol. 17, EGU2015-14022, 2015
EGU General Assembly 2015

Atmospheric exchange of carbon dioxide and methane of a small water body and a floating mat in the Luther Marsh peatland, Ontario, Canada

Magdalena Burger, Sina Berger, and Christian Blodau
University of Muenster, Muenster, Germany (christian.blodau@uni-muenster.de)

Recent investigations have suggested that small water bodies cover larger areas in northern peatlands than previously assumed. Their role in the carbon cycle and gas exchange rates are poorly constrained so far. To address this issue we measured CO_2 and CH_4 fluxes on a small water body (ca. 700 m^2) and the surrounding floating mat in the Luther Marsh peatland in Ontario, Canada from July to September 2014. To this end we used closed chambers combined with a portable Los Gatos high-resolution trace gas analyzer at different water depths and distances from the shore on the pond and with different dominating plant types on the floating mat surrounding the pond. In addition, CO_2 concentrations were recorded in high temporal resolution using an infrared sensor system during selected periods. Air and water temperature, humidity and temperature of the floating mat, wind speed and direction, photosynthetically active radiation, air pressure and relative humidity were also recorded as auxiliary data at the study site. The results show that pond and floating mat were sources of methane throughout the whole measuring period. Methane emissions via the ebullition pathway occurred predominantly near the shore and on the floating mat. During the daytime measurements the floating mat acted as a net sink and the pond as a net source of CO_2. The dynamics of CO_2 exchange was also strongly time dependent, as CO_2 emissions from the pond strongly increased after mid-August. This suggests that photosynthesis was more affected by seasonal decline than respiration process in the pond and that the allochthonous component of the CO_2 flux increased in relative importance towards fall.