Airborne based CH$_4$ flux estimates at Lake Wohlen

Continuous on-board measurements of CH$_4$ (Fast Methane Analyzer, Los Gatos Research Inc., USA) allow to quantify the methane flux along the flight legs over the lake.

Ground based measurements by bicycle at the raised bog of Rothenthurm

Complementary ground based measurements were performed to gather information about local CH$_4$ sources. We installed a Fast Greenhouse Gas Analyzer (Los Gatos Research Inc., USA) on a bicycle trailer to measure CH$_4$, CO$_2$ and H$_2$O concentrations. The cycling route was recorded by a GPS unit.

CH$_4$ gradients along west-east transects:
- Conc. increase the longer the air parcel travels over the lake
- Morning: neg. gradient with down-valley winds (easterlies)
- Noon/Afternoon: pos. gradient with up-valley winds (westerlies)

Regional CH$_4$ distribution on Aug 26th 2010
Slightly higher concentrations in the afternoon, but regional picture remains constant, including local hot spots. The hot spots are numbered in the afternoon track, referencing the corresponding photos. The last photo shows the bicycle trailer.

Conclusions
- Aircraft based measurements are a powerful tool to estimate regional scale fluxes
- The magnitude of aircraft based flux estimates is comparable to ground based flux measurements for rather homogeneous sources
- To distinguish different local sources, complementary ground based measurements are needed