Geophysical Research Abstracts
Vol. 21, EGU2019-17124-1, 2019
EGU General Assembly 2019

Profile and flux measurements of methane in the Amazon rainforest.

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Methane (CH_4) is the second most important long-lived anthropogenic atmospheric greenhouse gas, but its natural sources are still not well understood. One source of uncertainty is the role of wetlands, which are estimated to be responsible for 25-50% of the global CH_4 emissions. The Amazonian rain forest is estimated to hold 90-120 Pg of carbon, which is approximately 14-27% of the carbon stored in vegetation worldwide. The region is characterized by high precipitation rates and large wetlands, and it has been estimated that the Amazon basin emits 7% of the annual total CH_4 emissions. Due to its remote location, micro-meteorological measurements are rare and absent for other gases than CO_2.

The 50 m high K34 tower (field site ZF2) is located in a pristine tropical forest region 60 km northwest of Manaus (Brazil), and is located next to a waterlogged valley, a possible location for anaerobic CH_4 production. In October 2018, in addition to the existing EC CO_2 system, a Relaxed Eddy Accumulation (REA) system was set up at this tower, connected to an in-situ FTIR-analyzer. This set up measures fluxes and concentration profiles of CO_2, CO, CH_4, N_2O and $\delta^{13}CO_2$. In addition, by use of flux chambers, CH_4 and CO_2 fluxes of soils and rivers will be measured in the footprint of the REA measurements. This combination of measurements will provide inside in ecosystem CH_4 uptake and emission processes and their driving factors. In this presentation, the first results of these field measurements will be shown.