Geophysical Research Abstracts
Vol. 20, EGU2018-13161, 2018
EGU General Assembly 2018


# Environmental controls of biogenic volatile organic compound emissions from a grazed grassland in Dorinne, Belgium

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Despite the growing interest for oxygenated volatile organic compounds (OVOC), current knowledge about OVOC exchanged by grassland and the environmental factors driving those remains lacunar. However, those ecosystems represent an important part of the total earth surface (13.37%). This study conducted on a grazed grassland therefore aims to quantify OVOC exchanges over full grazing seasons in order to understand the mechanisms behind these exchanges. It took place within the activities of the CROSTVOC project (CROp Stress VOC) and therefore gives an important attention to the stress induced by cow's grazing. The eddy covariance method was used for flux quantification, with a conventional hs-PTR-MS for the measurements of OVOCs mixing ratios during two whole grazing seasons (2014 and 2015).
This study pointed out that several OVOCs were exchanged in variable quantities, with methanol being by far the most important. Methanol fluxes exhibited a clear diurnal cycle with close-to-zero fluxes at night and maximum fluxes at midday. The average methanol emission in the summer (19 ng(C).m-2s-1) was in the same range of other studies, being lower than the average found by Bamberger et al. (2010) (30 ng(C).m-2s-1) and by Ammann et al. (2009) (29 ng(C).m-2s-1).
Driver analysis is still ongoing but first results showed that the methanol flux was particularly correlated to the photosynthetic photon flux density, the evapotranspiration and the gross primary production. We believe that these results come mainly from the control practiced by stomatal conductance and plant growth, with fluxes decreasing from summer to autumn for a same level of radiation. Temperature, which is often described has a main driver of methanol flux was not on this site. Methanol flux modelling based on Gunther's approach will be carried out.
Impact of grazing on methanol fluxes was hardly discernable since an increase in the cow's stocking density did not contribute to a significant rise of methanol emission. This is probably due to the fact that even with a stocking density associated to intensive management only a small fraction of the flux footprint was grazed in days prior to the measurement. On the contrary, increased stocking density switches acetaldehyde, acetone and acetic acid fluxes from deposition to emission.