

**From carbon emissions to cloud formation:
The role of aerosol chemistry in feedbacks between climate and vegetation**

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The “climate-saving role” of vegetation is primarily related to the uptake of atmospheric CO₂ for photosynthesis and biomass production. However, the picture is more complex. Some of the carbon taken up by plants is released back into the atmosphere as volatile organic compounds (VOCs). This release is small in terms of mass, but it has a big impact on climate: VOCs are precursors for atmospheric organic aerosols and clouds, which both have an overall cooling effect on the climate through reflecting solar radiation to space. Recent advances in mass spectrometric techniques have enabled the combined analysis of molecular composition and volatility of organic aerosol particles and their precursor gases in real time (Thornton et al 2020). These advances have allowed detailed observational insights into emissions and formation processes of biogenic aerosols and their interactions with clouds, a selection of which I will present here. In addition, I will discuss how these novel observational data are used in modelling approaches from the process to the global scale in order to investigate climate feedbacks between the biosphere and the atmosphere.

[1] J. Thornton et al., *Acc. Chem. Res.* **2020**, 53, 8, 1415–1426.