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Modeling foliar methanol emissions from cotton leaves

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Methanol is besides methane one of the most abundant volatile organic compounds (VOC) in the lower atmosphere. Emissions of which have been observed during different processes that include changes in the cell wall structure, like cell expansion, growth, destruction of cell walls and generation of intercellular air spaces.

We developed a dynamic model to describe the time-dependent changes of methanol emissions from the foliage of cotton (*Gossypium hirsutum*). The model consists of storage pools within the leaves, liquid and lipid phase and a gas phase pool, located in the sub-stomatal cavity. Methanol emissions are strongly controlled by stomata which is reflected by inclusion of a stomatal control term as well. The model is able to link dynamic alterations of methanol emissions to the compounds physico-chemical properties and estimate storage pool sizes within the leaf liquid and lipid phases as well as the gas phase pool size.