Geophysical Research Abstracts
Vol. 21, EGU2019-414, 2019
EGU General Assembly 2019

Quantification of BVOC emissions from Mahogany (*Swietenia macrophylla* King) measured using a dynamic branch cuvette system and proton transfer reaction mass spectrometry (PTR-MS)

Lejish Vettikkat, Savita Datta, Priya Yadav, Haseeb Hakkim, Ashish Kumar, Baerbel Sinha, and Vinayak Sinha
Indian Institute of Science Education and Research Mohali, Earth and Environmental Sciences, Mohali, India (vsinha@iisermohali.ac.in)

Biogenic volatile organic compound (BVOC) emissions such as terpenes from varied tree species are highly reactive and when mixed with anthropogenically emitted nitrogen oxides act as strong precursors of secondary pollutants such as ozone and secondary organic aerosol, with consequences also for cloud formation and the regional climate. Mahogany (*Swietenia macrophylla* King) trees occupy an area of $\sim$150 million ha, and are widespread in Central and South America and parts of South Asia. The species is listed in the Convention on International Trade in Endangered Species (CITES) of Wild Fauna and Flora Appendix II due to widespread unsustainable logging, and silviculture and agroforestry of Mahogany are increasing globally to keep up with the demand for its highly-valued best quality timber. However, to the best of our knowledge, its BVOC emissions remain unknown.

Here, we quantified the emission flux (EF_{BVOC}) of naturally-growing Mahogany (*Swietenia macrophylla* King) at a site in North India using a dynamic branch cuvette and rapid VOC measurements made using a high sensitivity proton transfer reaction mass spectrometer (PTR-MS). BVOC emissions were studied as a function of temperature, photosynthetically active radiation (PAR) and other physiological factors for a better understanding of the drivers of emission flux. It was found that *Swietenia macrophylla* King emitted very high rates of monoterpenes with highest emissions during the monsoon season followed by the post-monsoon season and summer season. Surprisingly, significant co-emission of other reactive compounds that have recently been observed in ambient air over tropical rainforests was also observed, and the diurnal variability of the monoterpene flux appeared to be more strongly driven by PAR rather than temperature with peak hourly values reaching as high as 78 micrograms of monoterpenes/g_{DW}/h.