



Flooding effects on plant physiology and VOC emissions from Amazonian tree species from two different flooding environments: Varzea and Igapo

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A land area of 300.000 km² in the Amazon basin is subjected to a continuous flooding pulse, being flooded for 210 days a-1 on an average (Junk et al. 1993). To survive the flooding period vegetation has developed several morphological, anatomical and physiological strategies to mitigate the produced stress due to root anoxia. One of the strategies is fermentation of sucrose in the roots to comply with the energy demand under anoxia. The resulting toxic metabolite ethanol is transported through the transpiration stream to the leaves and can be directly emitted into the atmosphere or converted to acetaldehyde and/or acetate, still volatile enough to be partly released. We investigated short-term and long-term flooding effects on physiology and VOC emission by plant species from várzea and igapó and observed ethanol and acetaldehyde emissions from the várzea species *Vatairea guianensis* after one day of flooding, which decreased considerably within the next three days. The same species from igapó showed no acetaldehyde emission and much lower emission rates of ethanol, than the várzea species. In contrast *Hevea spruceana* from both várzea and igapó showed no ethanol or acetaldehyde emissions. After long term flooding (2 months) we did not find any emissions of acetaldehyde or ethanol from all plant species investigated. However, isoprene and monoterpene emissions were clearly affected, showing a significant decrease. Carbon dioxide assimilation was not affected by short term flooding, but declined after two months root anoxia in the case of *Hevea spruceana*.