



Methane emissions from floodplain trees of the Amazon basin

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Wetlands are the largest source of methane to the atmosphere, but emission estimates are highly uncertain leading to large discrepancies between emission inventories and much larger estimates of the Amazon methane source derived at larger scales. We examined methane emissions from all emission pathways including aquatic surfaces, emergent soils and herbaceous vegetation and more than 2000 trees from 13 locations across the central Amazon floodplain in 2014. Our data are the first measurements of stem emission from emergent portions of inundated trees in the Amazon and they demonstrate that regionally, tree stems are the dominant means of emissions for soil produced methane to the atmosphere. Emissions via the range of egress pathways varied substantially between sample locations and water-table exerted some control over emissions from ~2m below the soil surface upto 0.5-1m of inundation. Higher water (upto ~10m of inundation) exerted no further control over emissions. Applying our measurements to models of whole tree emission and scaling to the entire Amazon lowland basin demonstrates the significant contribution of trees to regional emissions that can close the Amazon basin methane budget.