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Methane Emission from Tropical Rivers

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Inland water is already known as an important source of methane to atmosphere. Methane is produced in anaerobic environments usually find in lakes and floodplain bottom sediment. It is the main reason that almost all information regarding methane flux come from this environments. However, while floodplain dries during low water season reducing methanogenesis, rivers keep the capacity to emit methane throughout the year. Here we present preliminary results of CH_4 flux measurements done in 6 large tropical rivers within the Amazon basin. We measured 17 areas using floating chamber during dry (low water) season, between September and November of 2011, in Amazon river mainstem, Araguaia, Xingu, Tapajós, Madeira, and Negro Rivers. Measured fluxes of all rivers ranged from 59.3 to 2974.4 mmol m^{-2} yr^{-1}. Geomorphologic structure of channels is one important factor that contributes to this high heterogeneity due to development of low flow velocity depositional settings allowing formation of anoxic zones in rivers. Hydraulic and sediment barriers in the confluence of river channels promote the generation of natural dams which function as a trap for the suspension load favoring the deposition of organic rich muds. This kind of environment is very different from common river channels and has a stronger potential of methane emission. Average values of our flux measurements for this two river environments show that depositional areas can have much higher fluxes than the main channel, 1089.6 and 163.1 mmol m^{-2} yr^{-1}, respectively. Hence, CH_4 flux from these depositional zones is similar to some tropical floodplain lakes and reservoirs. Although the low flux from channel, the area covered by water is very large resulting in a significant contribution to the regional methane emission to the atmosphere. Moreover, mapping the area of these depositional river zones will give us a better idea of the magnitude of methane flux from tropical rivers.