Geophysical Research Abstracts
Vol. 15, EGU2013-10912-1, 2013
EGU General Assembly 2013

Assessment of methane fluxes from a tropical rain forest in Africa

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Estimation of methane (CH4) fluxes in terrestrial ecosystems is becoming the object of numerous studies in recent years. This is due to the environmental relevance of this gas and, from a technical point of view, to the development of new tools that allow the quantification of CH4 fluxes in environments where the complexity of sources and sinks is challenging. In the present study CH4 fluxes were measured over and below the canopy of a rain forest in Ghana by means of the eddy covariance technique and the new open-path sensor Li-7700, for 4 consequent months. Below canopy fluxes, measured at 2 meters height from soil surface, were quite low and on average we got a net daily sink (around 0.8 nmol m-2 s-1) during the dry season and a net source (2.5 nmol m-2 s-1) during the wet season, with morning peaks up to 10 nmol m-2 s-1. Above canopy fluxes seems to be related to the rain frequency. In fact estimates from the first weeks, corresponding to the end of the wet season, show positive fluxes (emission) with peaks that reach 40-50 nmol m-2 s-1. With the diminishing of the precipitations, fluxes decrease and trim around zero with some negative mean values. In addition to the flux estimate, the error assessment, the quantification of the minimum detectable flux and issues related to the use of this tool in remote environment are discussed.