B043-01 - First Amazon Methane budget based in atmospheric long term data provided by aircraft vertical profiles measurements

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Abstract

The overall Methane (CH_4) budget remains highly uncertain even with the efforts to improve the estimates and contributions of its many sources (natural and anthropogenic) and few sinks. Wetland emissions are considered the primary natural CH_4 source but with large uncertainty in estimations. Tropical regions like the Amazon, host some of the largest wetlands areas on the globe. However, these regions are still poorly observed with large-scale integrating observations. Here we present the first long term (2010-2018) atmospheric sampling of the lower troposphere over the Amazon using regular vertical profile (300m to 4.4km height) observations of CH_4 and carbon monoxide (CO) at four sites. The sampling was nearly biweekly using small aircrafts, to provide solid seasonal and annual CH_4 budgets with large spatial resolution. Was calculated a CO/CH_4 ratio to estimate CH_4 emissions from biomass burning. An increase in emissions mainly during the dry season at all sites from biomass burning was observed. The results show a regional variation in biogenic CH_4 emissions (total minus biomass burning emissions). There are comparably high emissions from the Amazon northeast region (SAN) exhibiting strong seasonality, with particularly high CH_4 fluxes one month before (February/March) the wet season peak. The second period of high emissions occurs during the beginning of the dry season (August). In the other three sites (ALF, RBA and TAB_TEF) located further downwind along the main air-stream, it were observed lower emissions, which represents approximately 20-33 % of what was observed in the northeast region and with a clear annual seasonality. Besides, we discuss how these data vary throughout the years and how it can be correlated to climate variables (temperature, precipitation and equivalent water thickness) and with human-driven influence (biomass burning), which both could be impacting this variability and annual seasonality.

Authors

Luana S Basso
INPE National Institute for Space Research

Luciana V Gatti
INPE National Institute for Space Research

Luciano Marani
INPE National Institute for Space Research

Henrique L. G. Cassol
INPE National Institute for Space Research

Graciela Tejada
INPE National Institute for Space Research

Sergio Machado Correa
UERJ Rio de Janeiro State University

John B Miller
NOAA

Manuel Gloor
University of Leeds

Lucas G. Domingues
INPE National Institute for GNS Science Space Research

Egidio Arai
INPE National Institute for Space Research

Alber Sánchez
INPE National Institute for Space Research

Luiz EOC Aragão
INPE National Institute for Space Research

Caio Silvestre de Carvalho Correia
IPEN Nuclear Energy Research Institute

Raiane A. L. Neves
INPE National Institute for Space Research

Stephane P. Crispim
INPE National Institute for Space Research