

A first Amazon CH₄ budget based on atmospheric data

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Tropical land regions have until recently been poorly observed with large-scale integrating in-situ observations. Considering that the Amazon Basin represents 50% of the world tropical rainforest and Methane (CH₄) is the second most important anthropogenic greenhouse gases, contributing with around 18% to radiative forcing, and in 2014 the CH₄ mixing ratio increases of 9ppb in comparison with the previous year, reaching 1833ppb, is important understand the behavior of the Amazon Basin in relation to this greenhouse gas. Then, observing the global importance of CH₄ and uncertainties in the emission of this greenhouse gases in the Amazon Basin, this study aimed to determine CH₄ emission in the Amazon Basin. Were used regular vertical profiles in 4 sites distributed over the basin from east to west, Alta Floresta (ALF; 8.80°S, 56.75°W), Rio Branco (RBA; 9.38°S, 67.62°W), Santarém (SAN; 2.86°S; 54.95°W) and Tabatinga (TAB; 5.96°S, 70.06°W). Since 2010 samples are collected, fortnightly, aboard light aircraft between 300m and 4.4km. From the flux estimates we calculated basin wide budgets with some differentiation of underlying processes based on carbon monoxide from fires. The results showed that the Amazon Basin was a source of CH₄ during the study period, but the CH₄ emission variable in the different regions and variability with the years, these can be related with the climatological variations, 2010 and 2012 were driers years and 2011 and 2013 were wet years. With these results is possible to observe the importance of conducting studies on a regional scale to elucidate the behavior of the entire Amazon Basin. And the importance of long-term studies due the variation in emissions year by year, so that the results can be assumed to average behavior a long time series is necessary to take into account the methane balance from the Amazon Basin.

Acknowledgment: FAPESP, NERC, CNPq, MCTI, NOAA and IPEN