

Carbon Monoxide Measurements as a Biomass Burning Tracer at the Amazon Basin

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The tropical rainforests have an amount of carbon stored into its plants and soil comparable to half of the amount of atmospheric carbon contained at the atmosphere before the start of industrialization at the 18th century. Among the tropical regions, the Amazon forest covers the largest area and also hosts the largest carbon pool (~200 PgC), corresponding for 50% of its biome globally (1). Considering the capability of rapid release and the amount of storage carbon, there are surprisingly few studies of emission ratios (2) and, in order to elucidate the actual contribution and the carbon emission from biomass burning in the Amazon Basin, measurements of carbon monoxide are an important tool.

We will report results of a pan-Amazon low troposphere program used small airplanes, in 7 study sites from 2000 to 2016. The aircraft measurement program was started in 2000 with monthly/biweekly vertical profile sampling at SAN (2.86S 54.95W). From December 2004 to December 2007 we performed vertical profiles at MAN (Dec 2004 / Dec 2007). In 2010, a new step in our program was started. We added three more aircraft sites: TAB (5.96S 70.06W), RBA (9.38S 67.62W) and ALF (8.80S 56.75W). In 2013 TAB site was moved to TEF (3.39S 65.6W) and we add two more aircraft sites with vertical profiles from 300m to 7300 m, at Salinópolis (SAH 0.60S; 47,37W) near the Atlantic coast and RBH at the same place then RBA, in the western Amazon.

The Amazon Basin biomass burning carbon emissions have been determined by applying a mass balance technique to carbon monoxide (CO) measured from vertical profiles in sites over the Amazon Basin, which is compared with carbon dioxide (CO₂) emission when it is a clear biomass-burning plume in the vertical profile (3).

We will present these CO results that is related to biomass burning and compare the carbon monoxide emissions with those from carbon dioxide, resulting in a ratio of carbon biomass burning emission which we will analyse with respect to climate, deforestation and number of fire hot spots.

References

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