

Amazon Greenhouse Gas Measurement Program

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With the objective to understand the role of the Amazon in the global carbon balance, poorly constrained component of the carbon cycle, and the climatic variation effect on this balance, we developed a scientific strategy of GHG measures involving different scales, since local until regional scales, using small aircraft to perform vertical profiles, measures in tower, flasks, satellite and FTIR. The LaGEE activities starting in 2003, constructing a replica of NOAA/ESRL/GMD GHG Laboratory and installing in Brazil in 2004. Since this time the places studied and the types of measures taken have grown to reach our goal.

The tropics are a poorly constrained component because until recently there have been very few lower troposphere greenhouse gas measurements that are regionally representative. Amongst the tropical land regions the Amazon is by far the largest and also hosting the largest carbon pools around 200 PgC.

The greenhouse gas (GHG) monitoring activities conducted firstly by IPEN/LQA from 2004 to 2015 (Atmospheric Chemistry Laboratory) and later by INPE/CCST/LaGEE study Amazon Basin and Brazilian coast. 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 to compare with GOSAT.

In 2016 a new measurements using FTIR (TCCON new site) start to be made with a partnership of BIRA-IASB / IFRO and INPE. The instrument is installed at IFRO campus in Porto Velho, Rondonia (8.74°S, 63.87°W). In 2017 we returned the 4 Amazon sites (RBA, ALF, TEF and SAN) and add a special measurements at coast in a 100m tower at Itarema, Ceará state with weekly flask samples. From 2000 to 2017, we performed 646 vertical profiles. The vertical profiles sampled from 300m to 4400m above sea level, measuring CO₂, CH₄, N₂O, CO and SF₆ on WMO mole fraction scales.

References

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