

RESUMO - ANÁLISES INSTRUMENTAIS E AMBIENTAIS

**THE FIRST ISOPRENE (BVOC) FLUX MEASUREMENTS LONG-TERM BY  
GAS CHROMATOGRAPH PHOTOIONIZATION DETECTOR (REAPER) IN  
THE AMAZON RAINFOREST**

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Understanding the role of Biogenic Volatile Organic Compounds (BVOCs) in atmospheric chemistry and their impact on oxidants and aerosol formation is essential for global environmental research. BVOC emissions, primarily sourced from biogenic processes, pose a challenge due to the vast diversity of vegetation and ecosystems, as well as temporal changes in land use. While prevalent BVOC emission models categorize vegetation into functional types, the variability in environmental parameters and temporal fluctuations within

natural canopies remains inadequately represented. This study introduces an innovative device system designed to address these challenges by integrating the Relaxed Eddy Accumulator and Gas Chromatograph Photoionization Detector (REAPER) in real-time measurement of isoprene fluxes. The system is portable, cost-effective, and lightweight, easily to deploy in remote environments. By enabling high temporal resolution measurements, this device overcomes limitations associated with traditional techniques and offers accurate chromatograms. The novel instrument also facilitates real-time data transmission through a cloud-based platform, allowing access to meteorological data, calculated parameters, chromatograms, and flux results. This feature supports deploying these systems across a wide range of sites and integrates them into existing flux tower networks. In conclusion, this research contributes to the advancement of isoprene fluxes measurement techniques and validation of satellite-based retrievals of isoprene abundances providing a valuable tool for scientists studying atmospheric chemistry and its impacts on the environment in diverse ecosystems, ultimately aiding in our understanding of the complex interplay between biogenic processes and atmospheric chemistry. The REAPER is installed in the ATTO tower in the Amazon rainforest and continuously measures Isoprene every hour within 10 to 20 parts per billion (ppb) content. All the meteorology and chemistry data are sent through the Internet anywhere in the world to measure the BVOCs fluxes. The device is designed to collect wind data from an anemometer, with a primary focus on the vertical component. Using this data, the device separates the incoming air into three sections: up, down, and neutral. The neutral air section is typically disregarded. The up-and-down air samples are collected in bags and analyzed using a Gas Chromatography Photoionization Detector (GCPID). After each run, the device performs calculations, including the  $\beta$ -coefficient and heat flux, as well as keeping a record of all the data from the anemometer. The device is also equipped with internet capabilities via a Raspberry Pi, which uploads the data to a spreadsheet in two separate files. One file contains data collected during the data collection phase, while the other file includes the  $\beta$ -coefficient, heat flux, average, and standard deviation of each wind component (U, V, W, and temperature).

Palavras-chave: bvocs; amazon; isoprene; gas chromatograph.