ChimSur

Towards a common framework for successful collaborations in modeling southern South American atmospheric chemistry

ModFir

CLIMAT AmSud

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Evaluation of the effect of the unprecedented 2024 wildfire season on air quality in South-America from observations and CHIMERE simulations

https://visio.numerique.gouv.fr/wyi-oxlt-lpo

During 2024, South America experienced one of the most intense fire seasons observed in recent decades, with fire activity concentrated primarily in the Amazon Forest and the Pantanal-Chiquitano region.

We studied the impact of these wildfire emissions on air quality across the continent using a combination of in-situ observations, gathered from official and open-access networks, and simulations performed with the CHIMERE chemistry-transport model with APIFLAME emissions. Model outputs were combined with PM2.5 measurements from over 400 locations across the continent, allowing us to quantify the impact of these wildfires on atmospheric pollution during this period.

Our results show that **many South American cities were strongly affected by the fires**, with concentrations frequently exceeding the World Health Organization's recommended limit (15 µg/m³). Seasonal-averaged values surpassed 40 µg/m³ in Santa Cruz, Bolivia, and Rio Branco, Brazil, and exceeded 15 µg/m³ in many cities located further from the hotspots, across Brazil, Bolivia, Paraguay, Peru, and Colombia. These results, combined with simulation estimates, suggest that more than 170 million people were exposed to PM2.5 concentrations that exceeded the WHO Air Quality Guidelines as a direct result of wildfire emissions.

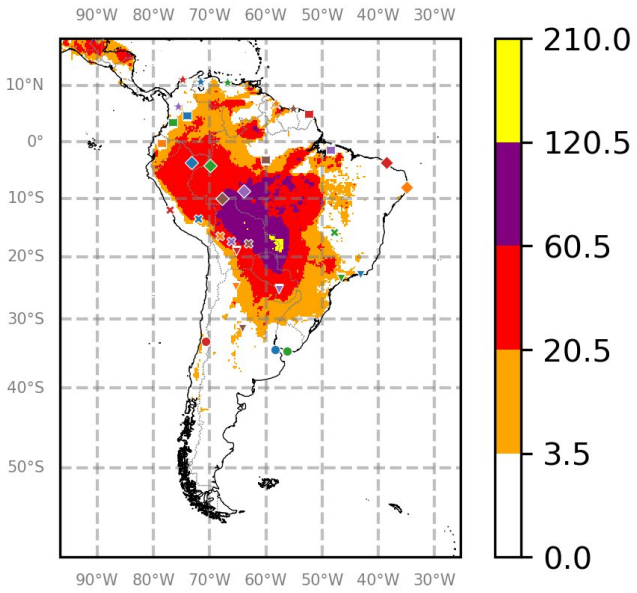


Fig. 1: Number of days when $PM_{2.5}$ concentrations has exceeded 15µg/m³ at a given location as a consequence of forest fires alone

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