(85-240513-B) **Constraining 2010-2020 Amazonian Carbon Flux Estimates with Satellite Solar-induced Fluorescence (SIF)**

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Amazonia's Net Biome Exchange (NBE), the sum of biogenic and wildfire carbon fluxes, is a fundamental indicator of the state of its ecosystems. It also quantifies the magnitude and patterns of short- and long-term carbon dioxide sources and sinks but is poorly quantified and out of equilibrium (non-zero) due to both direct (deforestation) and indirect (climaterelated) anthropogenic disturbance. Determining trends in Amazonia's carbon balance, shifts in carbon exchange pathways of NBE, and timescales of ecosystem sensitivity to disturbance requires reliable biogenic flux models that adequately capture fluxes from diurnal to seasonal and annual timescales. Our study assimilates readily available observations and a derived solar-induced fluorescence (SIF) product to estimate hourly biogenic carbon dioxide (CO_2) fluxes (here in units of mmol CO2 m^{-2} s^{-1}) as Net Ecosystem Exchange (NEE), and its photosynthesis and respiration constituents, at 12 km resolution using four versions of the data-driven diagnostic Vegetation Photosynthesis and Respiration Model (VPRM). Overall, the VPRM_SIFg biogenic flux model shows promise in its ability to capture Amazonian carbon fluxes across multiple timescale and moisture regimes, suggesting its suitability for larger studies evaluating interannual and seasonal carbon trends in fire as well as the biogenic components of the region's NBE.

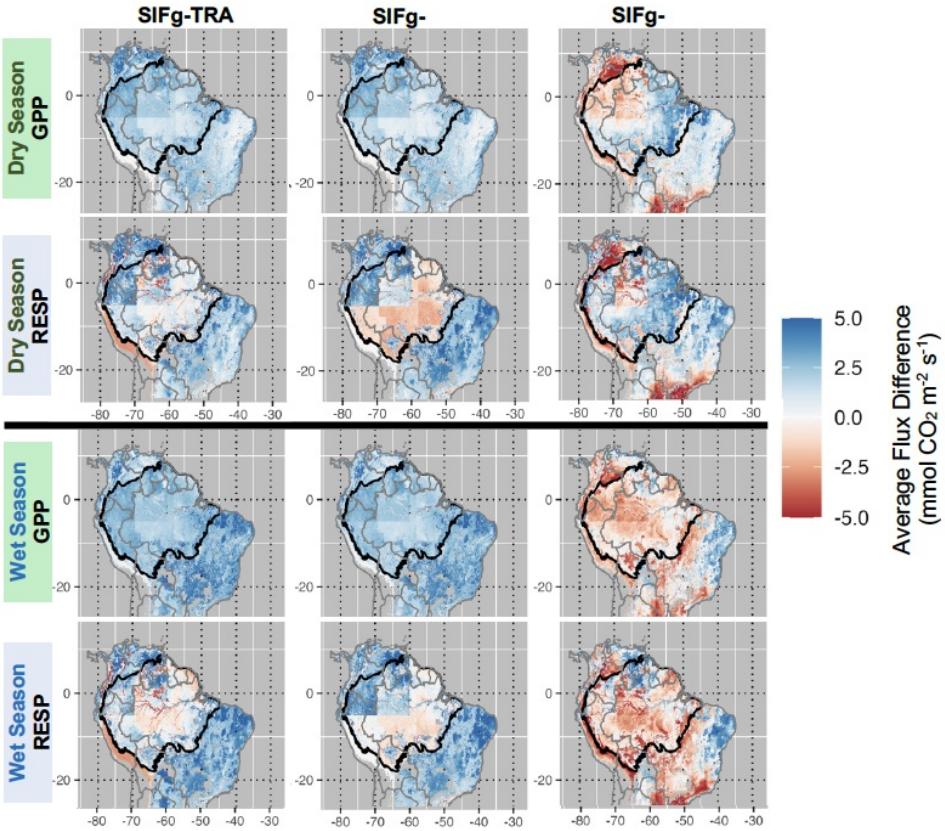

Figure 1. Average GPP and Reco flux differences between VPRM-SIFg relative to traditional VPRM formulations and SiB4. Averaging period is 2010-2020 (comparison with VPRM formulations) and 2010-2018 (comparison with SiB4). Top Panels: Dry season differences; Bottom Panels: Wet season differences. Blue (red) values indicate instances where SIFg estimates more (less) uptake and release than the comparison model.