

# Water Limitations in the Tropics Offset Carbon Uptake from Northern Greening



**Problem:** Gross primary productivity (GPP) from plant photosynthesis is the major conduit for ecosystem uptake and storage of atmospheric CO<sub>2</sub>, but global GPP patterns and sensitivity are uncertain in the face of ongoing global warming.

**Finding:** The increasing GPP trend in northern latitudes ( $\geq 45^\circ\text{N}$ ) from reduced cold temperature constraints is offset by increasing moisture limits to plant growth in the tropics.

**Impact:** Evidence of emerging positive climate feedback from increasing moisture restrictions to global productivity and carbon (CO<sub>2</sub>) sink activity.

Madani, Parazoo, Kimball, Ballantyne, Reichle, Maneta, Saatchi, Palmer, Liu, Tagesson, 2020: Recent amplified global gross primary productivity due to temperature increase is offset by reduced productivity due to water constraints. *AGU Advances*

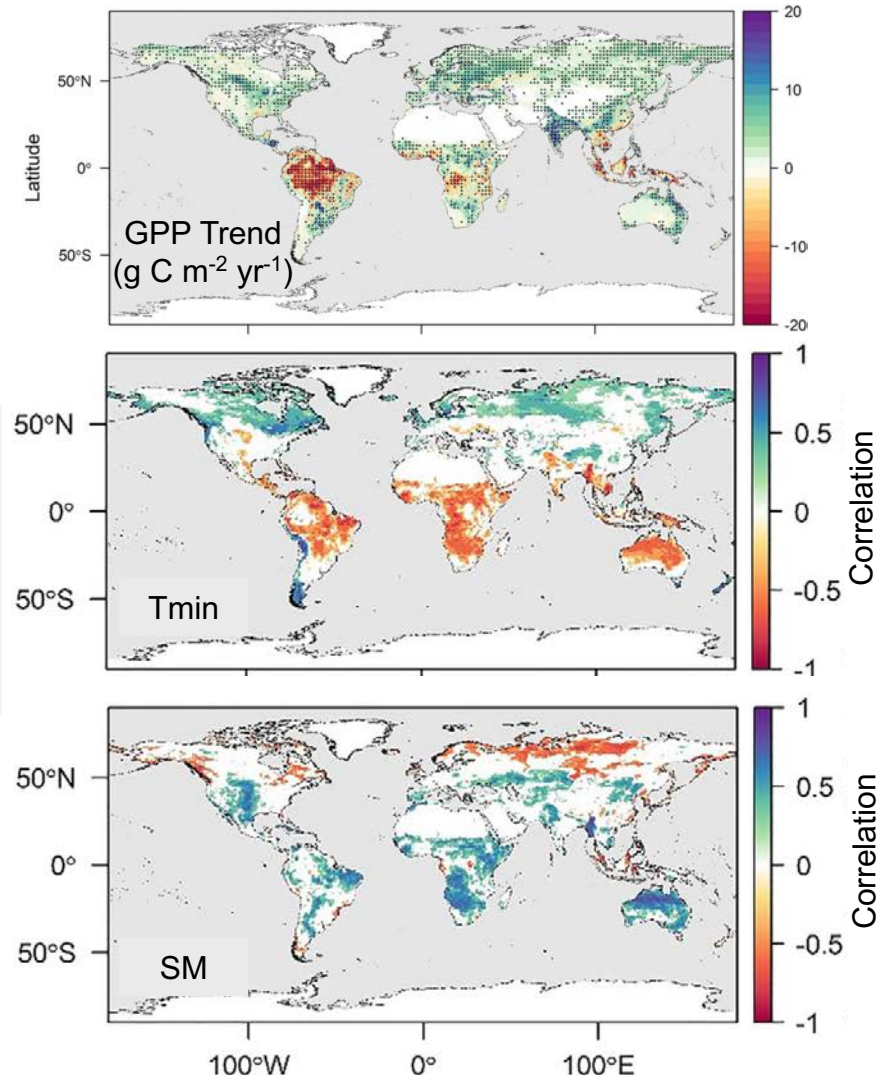


Figure: Estimated GPP trend (1982-2016) and Pearson correlations with daily air temperature (Tmin) and soil moisture (SM) controls to GPP