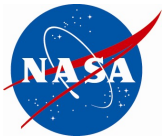
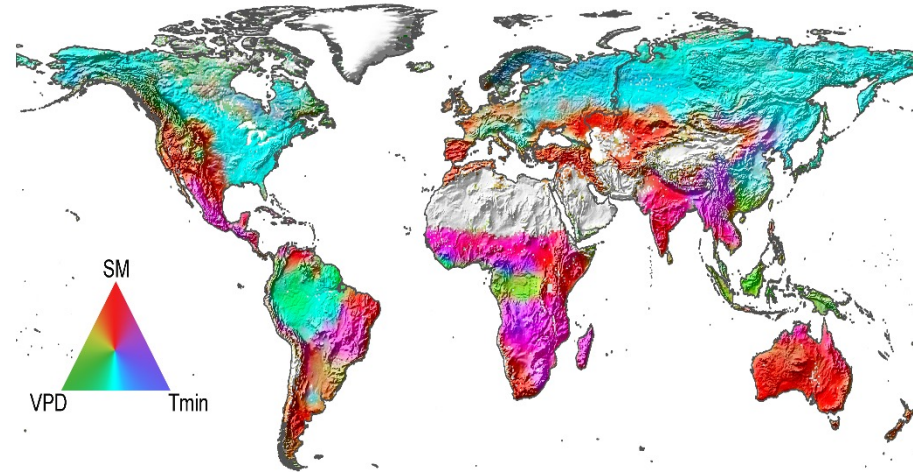


Bioclimatic Controls on Ecosystem Productivity Revealed Using SMAP and SiF Data



Problem: Ecosystem models rely on assumed bio-climatic controls to plant growth that have largely been defined from sparse monitoring sites and are uncertain at global scales.

Dominant Bio-Climatic Controls on Solar-Induced Fluorescence (SIF) Productivity



GPP = Gross Primary Productivity (aka plant carbon uptake during growth; Based on satellite SIF)

VPD = Vapor Pressure Deficit (dryness of the near-surface air)

SM = Soil moisture (SMAP-derived)

Tmin = Minimum surface air Temperature (freezing and temperature limitations on plants)

Findings:

Soil moisture controls GPP more strongly than VPD in arid regions. GPP is affected by joint climatic constraints so that VPD, Tmin, and SM are significant controls over 60, 59, and 35 percent of the global domain.

Impact:

Results reveal dominant climate control factors influencing productivity at the global scale. SIF control factors consistent with sparse tower observations, while providing better coverage for testing and refining global carbon and climate models.