Geophysical Research Abstracts
Vol. 20, EGU2018-13042-2, 2018
EGU General Assembly 2018

Drylands under pressure: vegetation modeling of dryland ecosystems in the Sahel

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Dryland ecosystems form a major land cover (40% of the Earth's surface, accounting for approximately 40% of the global net primary productivity) that is largely under pressure due to global change and human activities, but which is also largely understudied.
Our research hence aims to bridge current knowledge gaps in the paleotropics by unraveling the driving mechanisms of vegetation shifts in the Sahel. To do this, we combine in-situ measurements with dynamic global vegetation models (DGVMs) and remote sensing observations. In this presentation we show our first model results with two state-of-the-art DGVMs (the Ecosystem Demography model, ED2, and the Lund-Potsdam-Jena General Ecosystem Simulator, LPJ-GUESS), which we adapted to Sahel-specific conditions. Our parameterization of these models is based on recent in-situ measurements of meteorological conditions and plant functional traits. For validation purposes, we compare our model's primary productivity with flux tower measurements of carbon exchange across six Sahel sites. We finally discuss the usefulness of remote sensing data integration into ED2 and LPJ-GUESS, and support this discussion with a first assessment of key model sensitivities.