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Impacts of representation of stomatal conductance on vegetation distribution and functions under changing climate

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Stomata reponce is under control of light intensity, CO2 concentration, vapor pressure deficit, leaf water potential. For describing stomatal responses to such environmental factors, several empirical and semi-empirical models have been developed. How these models response to the changing environmental is an important issue, because between 80% and 90% of the total evapotranspiration from the land surface is caused by transpiration, and the process consumes almost half of the solar energy absorbed by the ground (Jasechko et al. 2013).

Here, we examined how representation of stomatal conductance pose impact on the forecast of geographical distribution of vegetation and its functions (i.e. carbon and water fluxes) under the forecasted climatic condition during the 21st century. We studied the African continent, because Africa is a useful target for assessing changes in vegetation due to climate change. The distribution of African vegetation is primarily regulated by soil moisture availability and thus is tightly coupled with climatic variability. For our study, we employed a dynamic vegetation model SEIB-DGVM. Our previous study shows that the model reproduced geographical distributions of the continent's biomes, annual gross primary productivity (GPP), and biomass over the African continent under current climatic conditions (Sato et al. 2012).

References

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