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Observed Monsoon Suppression Caused by Anomalous Interhemispheric Aerosol Transport Over the Gulf of Guinea

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Seasonal biomass burning and resulting aerosol emissions have been well documented to effect regional weather patterns, especially including low level convection. These effects can be due to the hydrophilic and radiative qualities of the aerosols emitted from such burning. This project focuses on utilizing observation and reanalysis data in order to understand the effects of smoke aerosols advected from the Southern hemisphere impact the dynamics of the West African Monsoon. For a broader impact, this region is home to more than 200 million people and thus understanding these climate patterns may carry great importance. Our results show that, of all monsoon months, anomalous smoke can decrease precipitation up to $\sim$5 mm day-1 in the month of July when aerosol values increase 40-50%. Early analysis indicates that biomass burning occuring near Angola/Congo advects over the Gulf of Guinea, towards the Intertropical Convergence Zone at around 850mb and stabalizes the atmosphere. Satellite observations in all-sky conditions show a decrease in low-level clouds (up to 500mb) and increases thereafter in the Gulf of Guinea and West African coastline. Additional obsersations reveal positive TOA SW radiation fluxes during increaed aerosol presence in association with higher loud area fractions. However, aerosol-only forcings account for $\sim$ -3 W m-2, a reduction in upwelling TOA Sw flux. Thus, there is evidence that increased transport of aerosols may induce both semi-direct and indirect effects in the Gulf of Guinea, ultimately leading to monsoon suppression.