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Towards downscaling precipitation for Senegal – An approach based on generalized linear models and weather types

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Changes in precipitation patterns with potentially less precipitation and an increasing risk for droughts pose a threat to water resources and agricultural yields in Senegal. Precipitation in this region is dominated by the West-African Monsoon being active from May to October, a seasonal pattern with inter-annual to decadal variability in the 20th century which is likely to be affected by climate change. We built a generalized linear model for a full spatial description of rainfall in Senegal. The model uses season, location, and a discrete set of weather types as predictors and yields a spatially continuous description of precipitation occurrences and intensities. Weather types have been defined on NCEP/NCAR reanalysis using zonal and meridional winds, as well as relative humidity. This model is suitable for downscaling precipitation, particularly precipitation occurrences relevant for drough risk mapping.