

Future projections for Southern West Africa: Climate Change

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Currently around 340 million people are living in Southern West Africa. It is projected that the population will more than double until the middle of the century. This increase is accompanied by a rapid urbanization as well as industrialization, which is expected to result in an increase of anthropogenic emissions. The magnitude of the increase depends on the degree of regulatory constraints on emissions enforced by the governments. To account for that, we consider two different scenarios, which were developed in conjunction with Phase 5 of the Climate Model Intercomparison Project (CMIP5).

We address the question how the climate will evolve in Southern West Africa until the middle of this century. We perform simulations with the aerosol-climate model ECHAM6-HAM2, which is not coupled to an ocean model. Therefore, we need information about the sea surface temperature (SST) and sea ice cover (SIC) in future conditions. For CMIP5, different institutes performed a well-defined set of simulations with their Earth System Models (ESM). Here we apply SSTs calculated in "long term" simulations of the twentieth-century climate and projections for the twenty-first century and beyond. But unfortunately coupled atmosphere-ocean models show a warm SST bias in the Gulf of Guinea (e.g. Roehrig et al., 2013). This warm bias results in a misrepresentation in the rain regime over South West Africa (Dunning et al., 2017). We will present results from these simulations detailing the projected changes in climate, including precipitation, over southern West Africa and discuss the role of the present-day SST bias on the projected changes.