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PARALLEL SESSION A : BENEFITS OF DOWNSCALING
A3: FROM DATA TO INFORMATION - A DISTILLATION DILEMMA

CMIP5, CORDEX and higher resolution RegCM4 multimodel ensembles comparison of projected changes in climate zones over West Africa

Mouhamadou Bamba SYLLA

WASCAL Competence Center Ouagadougou Burkina Faso,

West African climate have evolved in recent decades to respond to elevated anthropogenic greenhouse gas (GHG) forcing. Projected climate change generated by the multimodel ensemble of the CORDEX indicates continuous and stronger warming (1.5oC to 6.5oC) and a wide range of precipitation uncertainty (roughly between -30% to 30%) larger in the Sahel and increasing in the farther future consistent with CMIP5. This prevents a rigorous assessment of risks and impacts associated with the anthropogenic climate change over West Africa.

To overcome this issue and provide useful climate information, we employ the revised Thornthwaite climate classification applied to ensembles of CMIP5, CORDEX, and higher-resolution ICTP RegCM4 experiments (HIRES) and investigate shifts in climate zones over West Africa as a response to anthropogenic climate change. Such information on projected shifts of climate zones can help policymakers to develop response strategies for the most vulnerable areas. Evaluation of the reference period simulations indicates that the ensembles reproduce fairly well the observed climate zones, although with some notable discrepancies, larger in the CMIP5. CORDEX and HIRES provide realistic fine-scale information which enhances that from the coarser-scale CMIP5, especially in the Gulf of Guinea encompassing marked landcover and topography gradients. The late 21st century projections reveal an extension of torrid climates throughout West Africa. In addition, the Sahel, predominantly semi-arid in present-day conditions, is projected to face moderately persistent future arid climate. Similarly, the Gulf of Guinea shows a tendency in the future to experience highly seasonal semi-arid conditions. Finally, wet and moist regions with an extreme seasonality around orographic zones become less extensive under future climate change. Consequently, West Africa evolves towards increasingly torrid, arid and semi-arid regimes with the recession of moist and wet zones. These features are common to all multimodel ensembles with more pronounced changes in the higher-resolution RegCM4 projections. These modifications are largely due to the temperature forcing, as the contribution of precipitation change is comparatively smaller. Such changes point towards an increased risk of water stress and thus add an element of vulnerability to future anthropogenic climate change for West African water management, ecosystem services and agricultural activities

Mouhamadou Bamba Sylla1, Filippo Giorgi2, Nellie Elguindi2, Dominik Wisser3

1WASCAL Competence Center Ouagadougou Burkina Faso, 2International Centre for Theoretical Physics Trieste Italy, 3University of Bonn Germany