

**PARALLEL SESSION B : FRONTIER DOWNSCALING TOOL
B2: HUMAN-CLIMATE REGIONAL INTERACTIONS, TOWARDS RESMS**

Impacts of land use change and horizontal resolution in local climate by RegCM4 model

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The climate system is a complex system by its interactions which occur between its contents such as atmosphere, biosphere, plant and hydrology, etc. the climate model is an important tool which can be used to study these interactions. RegCM4-BATS model was employed to study the response of regional climate to land use change when it will be replaced by tall grass at Southern Sudan which Sudd wetland is one of the biggest swamps in Africa and belongs to the most extensive wetlands of the world. The Sudd region is located between 6° to 9°N and 29° to 32°E. The RegCM4-BATS were simulated twice, first run is to control and the second run to modify land use. This simulation done over Sudd swampy region which replaced into tall grass at two horizontal distances 50 km and 15 km. It is found that finer resolution has a strong impact on local climate of Sudd region which soil moisture increases led to increase in evapotranspiration and then precipitation (positive feedback mechanism) and temperature decreases as albedo decreases and sensible heat decreases. From the first experiment, replaced wetland by tall grass has only local impact over Sudd region; temperature will increase by up to 2°C degree for all months except the wet season. For precipitation, we found an increase mainly in (May-June-July) by 25%. Second, by decreasing horizontal distance has a strong impact on local climate of Sudd region. Soil moisture increases led to increase in evapotranspiration and then precipitation (increases up to 60 %). Temperature decreases by 2 °C as albedo and sensible heat decreases. At high resolution experiment, there is difference in results between tall grass and short grass expect for evapotranspiration and albedo. For Sudd region replaced it by tall or short grass does not make a significant difference under high resolution.

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