High resolution projection of climate change and climate extremes (drought/zud) in Mongolia under the increasing greenhouse gas

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In this study, a high resolution climate change scenario has been developed over Mongolia using regional climate model (RegCM3) under A1B GHG emission scenarios of fourth assessment report of IPCC. The model obtains initial and time dependent boundary data from ECHAM5 global climate model and totally 120 years integration is done. The model well simulated seasonal mean of cold and warm seasons and their intra-annual variability. There are less than few degrees of warm bias in winter and cold bias in summer seasons. Relative high bias corresponds to high mountain region of the country. Spatial correlation coefficients between observed and model simulated mean are 0.81 in winter and 0.89 in summer for temperature, and 0.40 in winter and 0.91 in summer for precipitation as respectively. According to climate change scenario over Mongolia, seasonal temperature is projected to increase 0.5-6.00C through beginning to end of century. Summer precipitation will decrease by 10-20% in 2011-2030, increase by 10-20% in 2046-2065 and decrease again by 10-40% in 2080-2099. Winter precipitation will increase by 10-60% in almost whole territory, especially over mountains. Drought/zud frequency will be projected to increase/decrease up to 3-6/1-2 times in 20 years over the country in the future depending on geographical distribution.