



Rainy season characterization in Burkina Faso and its representation by regional climate models.

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Five regional climate models (RCMs) were run over the West African region in order to reproduce the observed fluctuations and tendencies of the regional climate and to get reliable predictions till 2050. The five RCMs (CLM, HadRM3P, RACMO, RCA and REMO) were in a first set forced by the ERA-Interim re-analysis and then in a second set by large scale fields extracted from general circulation models simulations of A1B green house gases emission scenario.

The two sets of simulated rainfall data are analyzed and compared to the observed rainfall obtained from ten synoptic stations of Burkina Faso from 1961 to 2004. The rainy season characteristics are described through a number of parameters: the onset date, the end of season date, the number of rainfall days and the frequency and length of dry spells. The differences between the simulated and observed characteristics of the rainy season are assessed using non parametric statistical tests.

The analysis shows that the two sets of rainfall data produced by the two driving boundary conditions present some significant biases at the rainy season's characteristics even though the seasonal variation of rainfall is quite realistic in all models. The RCMs generally produce more frequent low rainfall values (between 0.1 and 5mm) and more frequent high extreme rainfalls (more than twice of the observations). The higher frequency of rainfalls (twice of the observed frequency) in the RCMs induce shorter dry spells (at the rainfall threshold of 0.1mm). But the dry spells become too long at the rainfall threshold of 5mm due to the low number of average rainfall events (10 to 50mm) in the models. Altogether, there are some disagreements between the models notably on the season duration and the annual rainfall amount but more striking is their differences in representing the high frequency characteristics of the rainfall. It is remarkable that these conclusions are valid whether the RCMs are driven by re-analysis or GCMs. In none of the characteristics a significant improvement of their representation could be found when the RCM is forced by the re-analysis. This suggests that the lateral boundary conditions are not as essential for imposing the synoptic variability to RCMs in the West African region.