Geophysical Research Abstracts
Vol. 18, EGU2016-16302, 2016
EGU General Assembly 2016

Statistical dynamical downscaling of present day and future precipitation regimes in southern Vietnam

David Schubert (1), Mark Reyers (1), Joaquim Pinto (1,2), Andreas Fink (3), and Klaus Massmeyer (4)

(1) Institute for Geophysics and Meteorology, University of Cologne, Cologne, Germany (schubert@meteo.uni-koeln.de), (2) Department of Meteorology, University of Reading, Reading, United Kingdom, (3) Institute for Meteorology and Climate Research, Karlsruhe Institute of Technology, Karlsruhe, Germany, (4) Department of Environmental Engineering and Applied Computer Sciences, University of Applied Science, Höxter, Germany

Southeast Asia has been identified as one of the hot-spots of climate change. While the projected changes in annual precipitation are comparatively small, there is a clear tendency towards more rainfall in the dry season and an increase in extreme precipitation events. In this study, a statistical dynamical downscaling (SDD) approach is applied to obtain higher resolution and more robust regional climate change projections for tropical Southeast Asia with focus on Vietnam. First, a recent climate (RC) simulation with the regional climate model COSMO-CLM with a spatial resolution of ∼50 km driven by ERA-Interim (1979-2008) is performed for the tropical region of Southeast Asia. For the SDD, six weather types (WTs) are selected for Vietnam during the wet season (April – October) using a k-means cluster analysis of daily zonal wind component in 850 hPa and 200 hPa from the RC run. For each calculated weather type, simulated representatives are selected from the RC run and are then further dynamically downscaled to a resolution of 0.0625° (7 km). By using historical WT frequencies, the simulated representatives are recombined to a high resolution rainfall climatology for the recent climate. It is shown that the SDD is generally able to capture the present day climatology and that the employment of the higher resolved simulated representatives enhances the performance of the SDD. However, an overestimation of rainfall at higher altitudes is found. To obtain future climate projections, an ensemble of eight CMIP5 model members are selected to study precipitation changes. For these projections, WT frequencies of future scenarios under two representative Concentration Pathways (RCP4.5 and RCP8.5) are taken into account for the mid-term scenario (2046-2065) and the long-term scenario (2081-2100). The strongest precipitation changes are found for the RCP8.5 scenario. Most of the models indicate a generally increase in precipitation amount in the wet period over Southeast Asia, especially in the longterm period. For south Vietnam nearly all models project a slight increase of precipitation. Based on these results, it is shown that the SDD approach provide useful information on climate projections over the tropical regime of Southeast Asia.