Geophysical Research Abstracts,
Vol. 11, EGU2009-10230, 2009
EGU General Assembly 2009

High resolution transient regional climate simulations for the Eastern Mediterranean

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Due to the IPCC, the Mediterranean ecosystems may be among the most impacted by global change drivers. The Eastern Mediterranean/ Near East (EM/NE) already now suffers of water scarcity. Our study focuses on how future climate change will impact the water availability in EM/NE and in particular the Jordan River catchment.
For that purpose, the non-hydrostatic meteorological model MM5 has been used to downscale the two IPCC scenarios A2 and B2 of the global climate model ECHAM4 in three nesting steps of 54 km, 18 km and 6 km resolution. The period of 1961-1989 represents current climate as observed greenhouse gas concentrations has been used within ECHAM4. In the same manner this period was also simulated using NCEP/NCAR reanalysis data to assess model performance of MM5 and detect uncertainties. Additionally simulated precipitation has been compared to rain gauge observations for validation.
Climate change simulations have been carried out transient for the period 1990-2099 up to a resolution of 18km for both scenarios. Simulations with 6 km resolution have been performed for the time slice 2085 – 2099.
Results show within the Jordan river catchment for the periods 2021-2050 and 2070-2099 an increase in yearly mean temperature of 1.2-1.9 K and 2.9- 5.2 K for the scenario A2 in comparison to the control run (1961-1989) and for the scenario B2 1.3-2.3 K and 2.4-4.1 K, respectively. Both scenarios show until 2050 no clear trend for changes in precipitation, but after 2050 until the end of the century there is a significant trend to decreasing yearly rainfall amounts of up to 25 %.