



Impacts of climate change on hydrometeorology of the Euphrates and Tigris Basins

Deniz Bozkurt (1), Omer Lutfi Sen (1), Ufuk Utku Turuncoglu (2), Baris Onol (3), Tayfun Kindap (1), Hasan Nuzhet Dalfes (1), and Mehmet Karaca (1)

(1) Istanbul Technical University, Eurasia Institute of Earth Sciences, Climate and Marine Sciences, Istanbul, Turkey (bozkurtd@itu.edu.tr), (2) Istanbul Technical University, Informatics Institute, (3) Istanbul Technical University, Aeronautics & Astronautics Faculty Department of Meteorology

In this study, it is aimed to demonstrate climate change impacts on hydrometeorology of the Euphrates and Tigris Basins which are the two major water sources in the Middle East. The ICTP-RegCM3 model has been used to downscale MPI's ECHAM5/MPI-OM and NCAR's CCSM for different emission scenarios in an ongoing project supported by UNDP. The simulations are for an area covering southeastern Europe and parts of the Middle East. The spatial resolution was chosen as 27 km, thus resulting 144x100 grid cells in the domain. To assess the performance of the model, 1961-1990 period was also simulated using the NCEP/NCAR reanalysis data and the simulation results were then compared with surface data from various sources and the data from the meteorological stations in Turkey. The climate change projections based on SRES A2 scenarios indicate up to 6°C warming by the end of 21st century for these basins. Increase in surface temperature will also lead to striking changes in the hydrometeorology of the basins. The regional climate change projections foresee that the decrease in snow cover especially in the eastern Anatolia region, which feed the Euphrates and Tigris rivers, will lead to significant seasonal changes in runoff in response to the increases in surface temperatures. In winter season in which snow accumulates, less snow will accumulate and more water will get into the flow. Since there will be less accumulated snow in snow melting season, less runoff will occur, and therefore, the flow regime in the rivers will be changed. Investigation of these changes will be very useful not only for demonstrating regional impacts of climate change on hydrometeorological variables but also for correct and effective use of water resources.