Abstract

We estimate future water resources of Cyprus by examining the water fluxes of its most important catchment, that of Kouris. Water fluxes such as surface runoff, actual evaporation and recharge are calculated by a combination of a daily rainfall-runoff model, and radiation transfer models, run with historical and predicted future climatic data. We compute the catchment discharge for historical periods based on ground-based measurements and MODIS satellite climatic data at high resolution over the catchment. Climatic change impacts on the water resources are predicted by ECHAM6, a middle range General Circulated Model. We used climatic data as input to our models, downscaled to the catchment resolution from two climate scenarios: the mild RCP2.6 and the extreme RCP8.5, to estimate water resources by the end of the 21^{st} century. The models show that the present mean annual rainfall resource of 174 Mm^3 will be reduced to 162 Mm^3 and 132 Mm^3, for the mild and extreme scenario, respectively. The present mean discharge of 21.5 Mm^3 into the Kouris dam from the catchment will decrease to 16.6 Mm^3 and 6.9 Mm^3 under the mild and extreme scenario, respectively. The present mean annual potential evaporation of about 1600 mm will increase by about 100 mm under the extreme scenario. Today an average of 31 Mm^3 of rainfall goes to surface water and groundwater resources; this will decrease to 25 Mm^3 and 15 Mm^3 under the corresponding scenarios. Given that inflow to the Kouris dam represents a significant fraction of all current inflows to the dams of Cyprus, then an almost 2/3 reduction in these inflows under the extreme scenario translates to a significantly reduced future water storage on Cyprus that will require the planning of larger engineering projects for desalination and recycling, for example, to meet its future water resource demands.