Geophysical Research Abstracts,
Vol. 11, EGU2009-4511, 2009
EGU General Assembly 2009

From low-flows to floods under global warming

D. PANAGOULIA
NATIONAL TECHNICAL UNIVERSITY OF ATHENS, WATER RESOURCES, ATHENS, Greece (dpanag@hydro.ntua.gr)

The low-flows and floods regimes of the Acheloo's river at the Mesochora catchment outfall in Western-Central Greece were analyzed under global warming conditions. The global warming patterns were simulated through a set of hypothetical and monthly GISS (Goddard Institute for Space Studies) downscaled scenarios of temperature increases, coupled with downscaled precipitation changes. The hydrology of the catchment is dominated by spring snowmelt runoff. Thus, the daily outflow of the catchment was simulated via the coupling of the snowmelt and soil moisture accounting models of the US National Weather Service River Forecast System. A low-flow day was defined as a day during which the streamflow did not reach the quarter of the long-term mean daily streamflow. A flood day was defined as a day during which the streamflow was more than two or three times the long-term mean daily streamflow In both hydrological cases (low-flows and floods) the basic components (number of days and episodes, duration, magnitude, frequency, etc) were determined. Both representations of global warming resulted in more numerous and longer low-flow episodes, as well as smaller mean values of minimum streamflows. Also, all climate cases posted larger low-flow deficits as the precipitation increased. On the other hand, both hypothetical and GISS downscaled climate cases predicted more numerous and longer flood episodes, as well as greater mean values of peak streamflows. Also, all climate cases reflected larger flood volumes as the precipitation increased. The low-flows results could possibly further jeopardize the river water quality, the reliability of the storages and dams, as well the water supply from local groundwater sources, while the combination of higher and more frequent floods could lead to greater risk of inundation and possible damage of existing structures.