Geophysical Research Abstracts,
Vol. 11, EGU2009-13835, 2009
EGU General Assembly 2009

Spatiotemporal drought monitoring for Pinios river basin, Greece

A. Loukas and L. Vasiliades

Laboratory of Hydrology and Water Systems Analysis, Department of Civil Engineering, University of Thessaly, Volos, Greece (aloukas@civ.uth.gr/+30-2421074169)

This study evaluates the suitability of artificial neural networks for spatiotemporal monthly drought mapping and monitoring in Pinios River Basin, Greece. Pinios River basin has an area of about 9500 km2, is located in Thessaly, an agricultural plain region surrounded by mountains and facing frequent and severe droughts. Monthly precipitation data for the period October 1960 to September 2002 from sixty six (66) precipitation stations were used to calculate the Standardized Precipitation Index (SPI) for multiple time scales as an index of meteorological drought assessment. Previous studies have shown that the 6-month time scale SPI is a suitable hydrological drought index for the study river basin and this index was selected for further analysis on spatiotemporal drought monitoring. A novel interpolation method was employed that accounted for possible non-linear orographic effects at different spatial scales and allowed for regionally and seasonally varying relief-climate relationships. The methodology uses artificial neural networks with inputs spatial coordinates, elevation data, and significant factors derived from principal components analysis of the precipitation data. The spatial and temporal validity of the interpolation method was checked using supervised split sample test. Seventy percent (70%) of the input and output dataseries were used in the development of the model and thirty percent (30%) of the remaining dataseries were used for the spatial and temporal validation of the methodology. The results of the developed methodology were compared with the results of geostatistical and deterministic methods of spatial interpolation and mapping and showed that the proposed technique gave satisfactory spatiotemporal interpolation results in the study basin and could be used for drought assessment and monitoring.