Geophysical Research Abstracts
Vol. 17, EGU2015-14491, 2015
EGU General Assembly 2015

Spatial statistics, variation and trends in SPI and their relation to stream flow in Portugal

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Stream flow regimes and variability are highly dependent on the precipitation input across the drainage basin, although it also depends on other factors (e.g. physiography and land use). Changes in precipitation, of natural or anthropogenic origin, are likely to affect surface runoff regimes and other hydrological processes. However, from surface runoff data alone it is difficult to disentangle between the nature of changes in the runoff regime. Thus, the main focus of this study is using spatial statistics derived from the Standardized Precipitation Index (SPI) calculated at several times scales for Portuguese river basins to get a better insight into climate change impacts on stream flow variability and trends across the basins. SPI constitutes a practical tool to assess, monitor and evaluate spatio-temporal variability of dry/wet conditions, over different periods, and here we are applying it at the basin scale using monthly precipitation data. The spatial interpolation and analysis functions in GIS are used to obtain SPI statistical values for each basin. A special focus is given on the synthesis of the severe or extreme wet/dry events. The statistics are used to better understand the flow variability in Iberian water courses flowing to the Atlantic Ocean, which drainage basins have different geometric, geological and climatic characteristics, as well as land use. Long stream flow time series are examined for trends in flow rates and fluctuations, and peak flows, which is expected to have implications for ecological processes and human usage throughout basins.