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Scaling versus deterministic trend in geophysical extremes: The case of river flow data

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Long-term changes in river flow time series and their relationship to climatic variability have been reported and analyzed since early last century. Recently, there has been a tendency to link observed changes in river flow to what is commonly known as global warming; a deterministic, human-activity-imposed increasing trend in global temperature. However, the treatment of changes in river flow data as deterministic trends has lead to paradoxical results in many studies. In this paper, it is shown that by admitting the scaling behavior in river flow time series, most of these paradoxical results can be avoided. Several case studies involving mean flow, maxima, and minima are presented.