

Stochastic modelling of hydrological extremes in a perpetually changing climate

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Current-day scholars have rediscovered change and given particular emphasis on climate change. However change has been well known and well studied on philosophical and scientific grounds since the era of Heraclitus and Aristotle. The omnipresence of change is confirmed by modern-day geological and paleoclimatic studies. These have provided concrete evidence that climate has been perpetually changing. The scientific background to study perpetual change has been developed by the Moscow School of Mathematics and most prominently Kolmogorov, who, among other achievements, laid the axiomatic foundation of probability theory and introduced the concept of stochastic processes. On the other hand, observations on long time series, most prominently by Hurst in Egypt, provided the empirical basis to understand change and its consequences in typical engineering tasks. Based on these lines, a stochastic framework is discussed that can deal with natural extremes under perpetual change, avoiding naïve methodologies which currently prevail.