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Exploring Hurst-Kolmogorov Dynamics: Unraveling the (temporal) link between Flood Insurance Claims and Streamflow Extremes in the contiguous USA

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This research investigates the intricate relationship between flood insurance claims and streamflow extremes in the contiguous USA, challenging the conventional belief of independence and non-catastrophic nature of insurable flood losses. Focusing on the Hurst-Kolmogorov dynamics, which emphasizes the temporal dependence of extreme flood events, we explore the implications of these dynamics on flood insurance practices and streamflow extremes. By analyzing the US-CAMELS dataset, we investigate the clustering mechanisms' impact on return intervals, event duration, and severity of the over-threshold events, which are treated as proxies for collective risk. Furthermore, stochastic approaches are developed to explore the correlation between properties of extreme events and recently published FEMA National Flood Insurance Program claims records in an exploratory analysis. This study aims to contribute valuable insights into the temporal aspects of streamflow extremes, considering the dependencies identified by the Hurst-Kolmogorov dynamics and providing essential information for enhancing the accuracy of flood insurance and reinsurance practices.