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Non-Gaussian Information-Theoretical Analytics for Diagnostic and Inference of Hydroclimatic Extremes

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Hydroclimatic spatiotemporal distributions exhibit significant non-Gaussianity with particular emphasis to overweight extremes, rendering their diagnostic and inference suboptimal with traditional statistical techniques. In order to overcome that limitation, we introduce and discuss a set of information-theoretic methodologies for statistical diagnostic and inference issued from exploratory variables of the general atmospheric and oceanic circulation in the cases of non-Gaussian joint probability distributions.

Moreover, the nonlinear information among various large-scale ocean-atmospheric processes is explored, bringing out added predictability to elusive weather and hydrologic extremes relative to the current state of the art in nonlinear geophysics. The methodologies are illustrated with the analysis and prediction of resonant ocean-atmospheric thermodynamic anomaly spells underneath high-profile floods and droughts.