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Interpretation of statistical signals in earthquake data

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Linking physical process with empirical statistical trends associated with extreme events is challenging. Non-uniqueness in models, biasing in data selection/processing and the apparent emergence of structure in complex stochastic systems all act to limit our ability to agree on a common null hypothesis, let alone quantify inherent predictability within complex earth systems. For example, here we use earthquake statistics to explore evidence for Characteristic earthquakes [1] and universality in earthquake interevent time distributions [2,3] to demonstrate how the statistics of extreme distributions [4] and selection bias can give rise to emergent trends that have previously been used to support physical models rather than being identified as statistical artefacts.

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