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Geomorphic Apophenia: Inferring meaning where there could be none?

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Apophenia describes the experience of seeing meaningful patterns or connections in random or meaningless data. Francis Bacon was one of the first to identify its role as a "human understanding is of its own nature prone to suppose the existence of more order and regularity in the world than it finds". Since then, experiments using streams of randomly generated binary sequences show a propensity for people to believe random data fluctuates more than it actually does. A more mainstream example of this is gamblers fallacy, where lucky or unlucky streaks are identified in the random selection of a roulette wheel. Furthermore, humans can also be influenced by a pre-existing ideas or a narrative that they then transpose into their findings leading to tending to support a hypothesis instead of disproving (confirmation bias).

As much of geomorphological science involves the interpretation of data, we argue that the persuasiveness of a narrative and human difficulties in recognizing genuinely random data could lead to apophenia. This presentation examines where apophenia might affect geomorphology, using examples from sediment stratigraphy, signal shredding, river meandering and the numerical modelling of landscape systems. In particular, we focus on how seductive it can be to link changes in landscape to drivers when there are potentially hazardous gaps in the data we are using.

In Geomorphology correlation has for long been substituted by causation. However, with emerging data rich methods including structure from motion, seismology, remote sensing and numerical modelling, former 'classic' techniques of qualitative interpretation can give way to quantitative hypothesis testing.