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The role of extreme noise in tipping between stable states

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Paleoclimatic records show that under glacial boundary conditions the climate has jumped irregularly between two different climate states. These are the stadial and interstadial climates characterized by extremely abrupt climate change, the Dansgaard-Oeschger events. The irregularity and the fact that no known external triggering is present indicate that these are induced by internal noise, so-called n-tipping. The high resolution record of dust from Greenland icecores, which is a proxy of the state of the atmosphere, can be well fitted by a non-linear 1D stochastic process. But in order to do so the noise process needs to be an alpha-stable process, which is characterized by heavy tails violating the central limit theorem. I will discuss how extreme events can influence the transition from one climate state to the other.