



Contrasting scaling properties of interglacial and glacial climates

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Understanding natural climate variability is essential for assessments of climate change. This is reflected in the scaling properties of climate records. The scaling exponents of the interglacial and the glacial climates are fundamentally different. The Holocene record is monofractal, with a scaling exponent $H \sim 0.7$. On the contrary, the glacial record is multifractal, with a significantly higher scaling exponent $H \sim 1.2$, indicating a longer persistence time and stronger nonlinearities in the glacial climate. The glacial climate is dominated by the strong multi-millennial Dansgaard–Oeschger (DO) events influencing the long-time correlation. However, by separately analysing the last glacial maximum lacking DO events, here we find the same scaling for that period as for the full glacial period. The unbroken scaling thus indicates that the DO events are part of the natural variability and not externally triggered. At glacial time scales, there is a scale break to a trivial scaling, contrasting the DO events from the similarly saw-tooth-shaped glacial cycles.

Ref: Zhi-Gang Shao and Peter Ditlevsen, Nature Comm. 7, 10951, 2016