



Dynamical regime shifts in the North Atlantic climate variability during the last 2 ka as revealed by terrestrial proxies

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The climate during the last two millennia is in general considered to be exceptionally stable compared to prior times. Nevertheless, there have been different episodes of distinguishable climate dynamics, most prominently the Medieval Climate Anomaly (MCA) and the Little Ice Age (LIA). In this study, we test a set of terrestrial paleoclimate records from Northern Europe for indications of temporary time-reversal asymmetry implying that during the thus identified periods of time, the data cannot be described by a linear Gaussian process and thus exhibit marked (possibly nonlinear) dynamics. Our analysis reveals that the onsets of both the MCA and the LIA are characterized by such complex dynamics indicating possible dynamical regime shifts in the regional climate system. Furthermore, the end of the Roman Warm Period as well as the 1.4k event are accompanied by similar signatures of time-reversal asymmetry.