The stochastic climate model shows that underestimated Holocene trends and variability represent two sides of the same coin

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Holocene sea surface temperature trends and variability are underestimated in models as compared to paleoclimate data. The idea is presented that the local trends and variability are related which is elaborated in a conceptual framework of the stochastic climate model. The relation is a consequence of the fluctuation-dissipation theorem, connecting the linear response of a system to its statistical fluctuations. Consequently, the spectrum can be used to estimate the timescale-dependent climate response. The non-normality in the propagation operator introduces enhanced long-term variability related to non-equilibrium and/or Earth system sensitivity. The simple model can guide us to analyze comprehensive models' behavior.