



## **Global analysis of recent frequency component changes in interannual climate variability**

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Increasing concentrations of greenhouse gases are largely responsible for recent observed warming of global surface air temperature. Climate change, driven by the enhanced greenhouse effect, may result in modification of both the mean and variability of climate. Observed trends in mean annual temperature and precipitation have already been identified. The potential impact of climate change on climate variability has predominately been investigated through changes to extreme event frequency or the shape of the daily frequency distribution. Less attention has been paid to any recent climate change impact on the interannual variability of temperature and precipitation.

We applied Empirical Mode Decomposition to annual time series from over 1500 temperature and 2800 precipitation stations around the world. We observed that the interannual variability of temperature and precipitation has marginally decreased since 1970. However, within this decrease, we find that the proportion of interannual variability due to the high frequency component (intradecadal,  $<10$  years) has increased substantially relative to the low frequency component (interdecadal,  $\geq 10$  years), especially for temperature. Our results highlight that climate change induced modification of climate variability occurs across a wide range of temporal scales and is not limited to intra-annual changes like daily extreme event frequency. These recent changes in hydroclimatic interannual variability have implications for multi-year drought severity and water resources management both now and under projected climate change. Our results also offer alternative confirmation that climate change is increasing the degree of randomness in the climate system.