



## **Historical periods and regional diversity of climate sensitivity to external forcing**

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The external or internal nature of observed long-term changes in Earth's climate is still under the question. We have studied climatic, volcanic and solar proxy's datasets to examine coherence and non-trivial relationships between various time series on inter-annual scale. Using cross-wavelet and non-linear techniques we have transformed time-series into time-frequency patterns to find external signal in climatic data. Patterns display transient correlations and nonlinear impact of solar and volcanic eruptions on climate. Historical periods in the past and regional diversity of climatic response to external forcing are analyzed. The problem of natural external forcing and solar reconstructions into the past from proxy records is discussed.