



1 Estimating Dimensionality of Geological Multi-Proxy Records

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Paleoclimate variations are reflected in varying properties of deposited lake sediments. Different climatic epochs like glacials/interglacials and stadials/interstadials are expected to follow dynamically different regimes.

We grasp these different dynamical properties in terms of dimensionality of the system, i.e. we assign the Karhunen-Loève dimension of the multi-proxy record (consisting of different physical, chemical, and/or biological parameters) of a sediment layer to its age.

We apply the proposed method to high-resolution multi-proxy data from Lake Baikal sediments. The results are validated by additional application of independent component analysis. A wavelet analysis of the major patterns observed is presented.