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1 Inferring Climate Variability from Grain Size Distributions by Statistical Analysis and Parametric Modelling

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Grain-size distributions can be used as geological tracers for the environmental conditions during the sedimentation process.

In this work, we analyze a 135.000-year spanning high-resolution record from Lake Baikal to extract information about climate change in Central Eurasia over the last glacial-interglacial cycle.

Analysis is performed via two different approaches: Given the frequencies of grains within different size classes, we apply an expectation-maximization algorithm to calculate distribution parameters (including their statistical uncertainties) for a model consisting of a superposition of up to five components. The temporal variation of the parameter values is compared to the outcoming of Karhunen-Loèwe and related nonlinear statistical decomposition of the multivariate data set.