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Deconvolution of continuous paleomagnetic data: Implementation of convenient graphical software based on optimization

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Deconvolution effectively overcomes the convolution effect of sensor response and improves the resolution of continuous paleomagnetic data acquired on pass-through superconducting rock magnetometers (SRM). However, the lack of an easy-to-use deconvolution tool has hindered the application of deconvolution for continuous paleomagnetic measurements. Here, we present MATLAB software UDECON with graphical user interface, as a convenient tool to perform realistically optimized deconvolution based on Akaike's Bayesian Information Criterion minimization method (Oda and Xuan, 2014). UDECON directly reads the original paleomagnetic measurement file, and allows the user to view, compare, and save paleomagnetic data before and after the deconvolution. We demonstrate that optimized deconvolution using UDECON can greatly help revealing detailed paleomagnetic information such as excursions that could be smoothed out during pass-through measurements. The application of UDECON to the vast amount of existing and future pass-through paleomagnetic and rock magnetic measurements on sediment archives recovered especially through the ocean drilling programs will contribute to our understanding of the geodynamo and paleo-environment by providing more detailed records of geomagnetic and environmental change through reliable deconvolution.

キーワード: superconducting rock magnetometer, deconvolution, sensor response, u-channel sample, ABIC minimization, MATLAB software
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