UDECON ソフトウエアによる古地磁気連続試料の自然残留磁化のデコンボルーションの実例

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Example deconvolution of natural remanent magnetization of a continuous paleomagnetic sample using the software UDECON

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Paleomagnetic records of marine sediment cores have often been obtained by pass-through measurements, which are known to smooth and alter magnetic signals. Amongst many efforts, a standalone open-use graphical software UDECON (Xuan and Oda, 2015) has been developed to deconvolve pass-through measurement data. As a case study to assess the applicability of the software to deconvolve natural remanent magnetization (NRM) of a continuous paleomagnetic sample, we chose 40 discrete samples from a piston core recovered in the northeast Pacific. We measured NRMs after alternating field demagnetization at 20 mT for both discrete samples and a simulated continuous sample, made by connecting the discrete samples.

The discrete samples show centimeter-scale variations in NRM. Such variations are smoothed out and mostly disappear in the results of the simulated continuous sample. However, after using the software to deconvolve the data, the variations are almost completely restored. Good agreement between the discrete sample data and the deconvolved data indicates that the deconvolution by the software is very successful. We observe detailed features of a directional reversal in the data from the discrete samples and in the deconvolved data but not in the data from the simulated continuous sample. This emphasizes that the deconvolution analysis by the software is a powerful tool to extract detailed features from continuous paleomagnetic records obtained by pass-through measurements.