HystLab:
New Software for Processing and Analyzing Hysteresis Data

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Abstract

Magnetic hysteresis loops are an important tool in theoretical and applied rock magnetism with applications to paleointensities, paleoenvironmental analysis, and tectonic studies, among many others. Hence, information derived from these data is amongst the most ubiquitous rock magnetic data used in the Earth science community. Despite their prevalence, there are no general guidelines to aid scientists in obtaining the best possible data and no widely available software to allow the efficient analysis of hysteresis loop data using the most advanced and appropriate methods. Here we provide a brief outline of detrimental factors and simple approaches to measuring better hysteresis loops as well as introducing a new MATLAB software package called *Hysteresis Loop analysis box* (*HystLab*) for processing and analyzing loop data. This graphical user interface software is capable of reading the wide range of data formats that are generated by the multiple types of equipment typically used to measure hysteresis loops. *HystLab* provides an easy-to-use interface allowing users to visualize their data and perform advance processing, including loop centering, drift correction, linear and approach to saturation high-field slope corrections, as well as loop fitting to improve the results from noisy specimens. A large number of hysteresis loop properties and statistics are calculated by *HystLab* and can be exported to text file for further analysis or can be explored using the in-built bi-plot functionality of *HystLab*. All plots generated by *HystLab* are customizable and user preferences can be saved for future use. In addition, all plots can be exported to encapsulated postscript files that are publication ready with little or no adjustment, greatly enhancing the workflow productivity when processing and analyzing large data sets.

Keywords: rock magnetism, hysteresis, software.