



## **Demagnetization Analysis in Excel (DAIE) - An open source workbook in Excel for viewing and analyzing demagnetization data from paleomagnetic discrete samples and u-channels**

Leonardo Sagnotti

Istituto Nazionale di Geofisica e Vulcanologia, Roma, Italy (leonardo.sagnotti@ingv.it)

Modern rock magnetometers and stepwise demagnetization procedures result in the production of large datasets, which need a versatile and fast software for their display and analysis. Various software packages for paleomagnetic analyses have been recently developed to overcome the problems linked to the limited capability and the loss of operability of early codes written in obsolete computer languages and/or platforms, not compatible with modern 64 bit processors.

The Demagnetization Analysis in Excel (DAIE) workbook is a new software that has been designed to make the analysis of demagnetization data easy and accessible on an application (Microsoft Excel) widely diffused and available on both the Microsoft Windows and Mac OS X operating systems. The widespread diffusion of Excel should guarantee a long term working life, since compatibility and functionality of current Excel files should be most likely maintained during the development of new processors and operating systems.

DAIE is designed for viewing and analyzing stepwise demagnetization data of both discrete and u-channel samples. DAIE consists of a single file and has an open modular structure organized in 10 distinct worksheets. The standard demagnetization diagrams and various parameters of common use are shown on the same worksheet including selectable parameters and user's choices. The remanence characteristic components may be computed by principal component analysis (PCA) on a selected interval of demagnetization steps. Saving of the PCA data can be done both sample by sample, or in automatic by applying the selected choices to all the samples included in the file.

The DAIE open structure allows easy personalization, development and improvement.

The workbook has the following features which may be valuable for various users:

- Operability in nearly all the computers and platforms;
- Easy inputs of demagnetization data by "copy and paste" from ASCII files;
- Easy export of computed parameters and demagnetization plots;
- Complete control of the whole workflow and possibility of implementation of the workbook by any user;
- Modular structure in distinct worksheets for each type of analyses and plots, in order to make implementation and personalization easier;
- Opportunity to use the workbook for educational purposes, since all the computations and analyses are easily traceable and accessible;
- Automatic and fast analysis of a large batch of demagnetization data, such as those measured on u-channel samples.

The DAIE workbook and the "User manual" are available for download on a dedicated web site (<http://roma2.rm.ingv.it/en/facilities/software/49/daie>).