

# Supporting Information for “Micromagnetic Tomography for Paleomagnetism and Rock-Magnetism”

Lennart V. de Groot<sup>1</sup>, Karl Fabian<sup>2</sup>, Annemarieke Béguin<sup>1,2</sup>, Martha E.

Kosters<sup>1</sup>, David Cortés-Ortuño<sup>1</sup>, Roger R. Fu<sup>3</sup>, Chloë M.L. Jansen<sup>1</sup>, Richard

J. Harrison<sup>4</sup>, Tristan van Leeuwen<sup>5,6</sup>, Auke Barnhoorn<sup>7</sup>

<sup>1</sup>Paleomagnetic laboratory Fort Hoofddijk, Faculty of Geosciences, Utrecht University, Utrecht, The Netherlands

<sup>2</sup>Department of Geoscience and Petroleum, Norwegian University of Science and Technology, Trondheim, Norway

<sup>3</sup>Department of Earth and Planetary Sciences, Harvard University, Cambridge, MA, USA

<sup>4</sup>Department of Earth Sciences, University of Cambridge, Cambridge, UK

<sup>5</sup>Mathematical Institute, Faculty of Sciences, Utrecht University, Utrecht, The Netherlands

<sup>6</sup>Department of Computational Imaging, Centrum Wiskunde & Informatica (CWI), The Netherlands

<sup>7</sup>Department of Geoscience and Engineering, Faculty of Civil Engineering and Geosciences, Delft University of Technology, Delft,

The Netherlands

## Additional Supporting Information (Files uploaded separately)

1. Captions for large Tables S1 to S2
2. Caption for Movie S1

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Corresponding author: Lennart V. de Groot, (l.v.degroot@uu.nl)

**Large Table S1.** Table with interpreted results of the Magnetic Tunneling Junction scan of the synthetic sample after applying a 1 T IRM pulse in the direction normal to the surface plane of the sample. The table consists of 12 columns, containing: **index:** unique index number of the grain, starting from the top of the sample going downwards; **centerdepth:** depth of the center of the bounding box around the grain with respect to the surface of the sample, in [ $\mu\text{m}$ ]; **diameter:** diameter of a spherical grain with the same volume as produced by the microCT analysis, in [ $\mu\text{m}$ ]; **volume:** volume of the grain as produced by the microCT analysis, in [ $\mu\text{m}^3$ ]; **Mx:** magnetization in the x-direction, in [ $\text{A/m}$ ]; **My:** magnetization in the y-direction, in [ $\text{A/m}$ ]; **Mz:** magnetization in the z-direction, in [ $\text{A/m}$ ]; **M:** total magnetization, in [ $\text{A/m}$ ]; **m:** total magnetic moment, in [ $\text{Am}^2$ ]; **Mr/Ms:** remanence ratio  $M_r/M_s$  as calculated given the saturation magnetization of magnetite (480 kA/m) and the volumes of the grains as obtained from the microCT analysis, [dimensionless]; **dec:** declination of the magnetization with respect to the x-axis of the sample, in [degrees]; **inc:** inclination of the magnetization with respect to the upwards normal surface of the sample, in [degrees].

**Large Table S2.** Table with interpreted results of the Quantum Diamond Microscope scan of the synthetic sample after applying a 1 T IRM pulse in the direction normal to the surface plane of the sample. The table consists of 12 columns, containing: **index:** unique index number of the grain, starting from the top of the sample going downwards; **centerdepth:** depth of the center of the bounding box around the grain with respect to the surface of the sample, in [ $\mu\text{m}$ ]; **diameter:** diameter of a spherical grain with the same volume as produced by the microCT analysis, in [ $\mu\text{m}$ ]; **volume:** volume of the grain as produced by the microCT analysis, in [ $\mu\text{m}^3$ ]; **Mx:** magnetization in the x-direction,

in [A/m]; **My**: magnetization in the y-direction, in [A/m]; **Mz**: magnetization in the z-direction, in [A/m]; **M**: total magnetization, in [A/m]; **m**: total magnetic moment, in [Am<sup>2</sup>]; **Mr/Ms**: remanence ratio Mr/Ms as calculated given the saturation magnetization of magnetite (480 kA/m) and the volumes of the grains as obtained from the microCT analysis, [dimensionless]; **dec**: declination of the magnetization with respect to the x-axis of the sample, in [degrees]; **inc**: inclination of the magnetization with respect to the upwards normal surface of the sample, in [degrees].

**Movie S1.** Movie of the 128 magnetite grains in the synthetic sample as produced by the microCT analysis. The grains have different colors for clarity; the colors do not have further meaning.