SQUID顕微鏡による測定データの評価と補正：ノイズ・ドリフト・位置決め

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Evaluation and correction of data obtained by scanning SQUID microscope: Noise, Drift and Positioning

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We have developed a scanning superconducting quantum interference device (SQUID) microscope (SSM) for imaging magnetic field distribution of geological rock samples. The distance between the SQUID and the sample can be calibrated with magnetic field generated with a precision dc-current applied to a thin and long wire. Here we show evaluation and correction of data obtained by SSM including noise and drift of the system and positioning of geological samples. First, noise of the system and the environment was evaluated based on the measurements with and without XY stage. Second, drift of the system and the environment was evaluated and corrected based on the measurements with crossings in X and Y directions. Third, the magnetic field image of a geological sample was assigned precisely to the optical image based on two artificial magnetic dipole placed on a sample holder outside of the geological sample as magnetic markers. We adopted FeCo as a material for the dipole with a 500-nm-thick layer deposited on a silicon substrate with DC-sputtering. The whole evaluation, correction and assignment could be easily conducted with a MATLAB software under development.