Magnetic Moment Measurements using Scanning SQUID microscope: Noise Reduction and Calibration

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Starting from around the 21th century, scanning SQUID (superconducting quantum interference device) microscopes (SSMs) have been used for paleomagnetism and the number of applications are increasing (e.g. Weiss et al., 2000, 2007; Gattacceca et al., 2006; Oda et al., 2011, Fu et al., 2014). SSMs enable one to obtain magnetic images at a scale of ~0.1 mm by measuring the vertical component of the magnetic field over geological thin sections. Recently, the Geological Survey of Japan (GSJ), AIST, in collaboration with Kanazawa Institute of Technology, have developed a SSM with a hollow-structured cryostat (Kawai et al., 2016; Oda et al., 2016). In the presentation, we show magnetic mapping of single crystal zircons with the GSJ/AIST SSM. Magnetic moments of single zircon crystals were estimated by fitting a theoretical expression of the magnetic field produced by a magnetic dipole to the data. Noise reduction, utilizing multiple measurement data, will be demonstrated. Also, calibration of magnetic moments measured with the GSJ/AIST SSM using a precision current source and a point magnetic source will be presented.

Keywords: Scanning SQUID microscope, noise level, magnetic moment, single zircon crystal, calibration

