R004-11
D 会場 ：11/25　PM2 （15:00-18:00）
17:45〜18:00

地質試料のための走査型 SQUID 顕微鏡システム：磁気画像データ処理ソフトウェアの開発

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Scanning SQUID microscope system for geological samples: Development of post-processing software on magnetic image data

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We developed a scanning superconducting quantum interference device (SQUID) microscope for imaging the magnetic field of geological samples in 2015 and have been improving. Since the development of the scanning SQUID microscope (SSM) system, various geological samples were measured including marine ferromanganese crusts, ferromanganese nodules, single grain zircon crystals, fault gauge samples, stalagmites with ultra-low magnetizations, ultramafic rocks with strong magnetization. Here, we provide details on the post-processing software ProcSQMicro that has been developed using Igor Pro since the introduction of the system. The main features are offset correction, a suite of drift corrections, flux-jumps correction, median filter, dipole fitting, dipole subtraction, upward continuation, and reduced-to-the-pole transformation. With “Advanced analyses” panel, a GUI with buttons and variable settings in ProcSQMicro used to fit dipole to a magnetic image, and subsequent subtraction. The panel also allows upward continuation, reduction-to-the-pole transformation as well as median filter. In the presentation, we demonstrate the features obtained for various geological thin sections. The figures below show examples of dipole fitting feature using SSM data obtained for a limestone sample from Miyako-jima Island. Left figure is a magnetic image for a thin section after AF demagnetization at 10 mT in Z-axis. Arrows are directions of the five largest dipoles fitted using ProcSQMicro. Black arrows are upward and gray ones are downward directions. Right figure is a magnetic image after AF demagnetization at 10 mT with tumbling. The difference in the directions of dipoles is considered as sporadic move of magnetization directions carried by multidomain magnetic minerals.