R004-07
C 会場 ：11/6　AM2 （10:45-12:30）
10:45～11:00

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Shock remanence distribution of single-domain titanomagnetite-bearing basalt sample

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Knowledge of a three-dimensional distribution of the shock remanent magnetization (SRM) intensity is crucial for interpreting the spatial change in magnetic anomalies observed over the crater and reconstructing the paleo-planetary field based on the anomaly data. However, the distribution of SRM properties have not been fully understood owing to the lack of subsample magnetization measurements for the experimental SRM-imparted samples. Here we report the results of newly designed SRM acquisition experiments using a magnetically well-characterized basalt sample bearing fine-grained single-domain titanomagnetite and remanence measurements for cube-shaped subsamples cut from the SRM-imparted samples, to investigate the SRM intensity and stability structures. Additionally, the pressure and temperature changes during the shock wave propagation were estimated from the impact simulations. In one series of experiments, the magnetic field was fixed at 100 μ T and the impact velocities were set to 1.3 (polycarbonate), 2.7, 4.0, 5.3, and 7.0 km/s (aluminum). The SRM intensity increases with increasing pressure value, and it deviates from the increasing trend near the impact point due to the significant temperature rise for each sample. In the other series of experiments, the shock experiments were conducted under the magnetic fields of 100, 150, 200, and 400 μ T with the constant impact velocity of approximately 5.5 km/s. The SRM intensities normalized by applied field intensity shows the similar values in whole pressure range, and thus, the SRM intensity is confirmed to be proportional to apple field intensity up to 400 μ T. On the basis of SRM experiments, remanence measurements, and impact simulations, we will discuss the empirical relationship between SRM intensity and pressure/temperature changes during the shock wave propagation and discuss the magnetic anomaly distribution over impact craters.