Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)
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PPS21-06 会場:201A 時間:5 月 21 日 16:45-17:00

ASTER スペクトルデータを用いた衝突クレーター判別の研究
A study on identification of terrestrial impact craters using spectral data obtained by ASTER

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The 182 terrestrial impact craters have been identified so far [1]. This number is much lower than those on the other solid bodies in the Solar System such as Moon, Mars, or Venus. On the Earth, most of structures of impact craters have been eroded and tectonized. In addition, some of preserved impact structures may have been buried or obscured by sediments and vegetation. However, since there are few studies on the global survey of terrestrial impact craters using satellite remote sensing, it is still unclear whether or not more impact craters are preserved on the Earth. The recent survey by Google Earth images discovered a new impact crater in Egypt, which has been already identified as impact origin by the later geophysical analysis [2]. In addition, four new impact structures were confirmed as terrestrial impact craters last year [1], suggesting the existence of more unidentified impact craters on the Earth. Therefore, it is expected that more candidate structures of impact craters would be found by the global survey using satellite remote sensing data.

In this study, we discuss the feasibility to find candidates of impact craters using spectral data by the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) instrument, which is an imaging instrument with 14 bands, from the visible to the thermal infrared wavelengths, onboard NASA Terra satellite. We show that the discrete concentric patterns in the multispectral data obtained by ASTER can be identified for several terrestrial impact craters. We also analyze the ASTER data for volcanos or dome structures formed by intrusive rocks. Based on these results, we will discuss the feasibility of global survey to identify terrestrial impact craters by ASTER data.

[1] Earth Impact Database, 2012, http://www.passc.net/EarthImpactDatabase/ Accessed: 02/Feb./2012.
[2] Folco, et al., The Kamil Crater in Egypt. Science, 329, pp.804-804, 2010.

キーワード: 分光, 衝突クレーター, リモートセンシング, ASTER, 地球観測, アストロバイオロジ