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Approach to crater chronology with Fourier Transform of digital terrain model

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Crater chronology is a method for estimating geological age of planetary surfaces by crater counting. Although this method is widely used, crater counting work takes very long time even by an experienced re-searcher. A cumulative size-frequency distribution of craters can be converted to a geological age in the crater chronology, however, only diameters and cu-mulative number densities of craters are used in this methodology. Other features such as crater geometry, depth and position are dismissed.
When an image or digital terrain model (DTM) of a cratered terrain are given, diameters and numbers of craters correspond to spatial frequencies and intensities in the Fourier transform domain. If there is a sys-tematic relationship between them, crater chronology might established in Fourier transform analysis instead of crater counting. This research is a trial of Fourier transform analysis to establish crater chronology with-out crater counting.
Although Fast Fourier Transform (FFT) spcifica-tion is affected by remote sensing image's specifica-tion, such as, contrast, albedo and sun altitude usually, FFT of Digital Terrain Model (DTM) has no effects of these elements. Recently, much DTMs of planetary bodies are processed from many space missions. For example, presice DTMs of the whole moon are pro-duced though the Japanese lunar mission Kaguya. Although statiscal analysis of Kaguya's lunar DTMs have been reported, FFT analysis has not been done. We investigate FFT specification of model DTMs of crater terrain.

Keywords: Fourier Transform, Crater Chronology