Craters Recognition Tool on Digital Terrain Model from LISM/TC, KAGUYA

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A tool for automatic recognition of craters and linear features on Digital Terrain Model is shown. This core technique is an application of generalized Hough transform, where Ellipsoid-modeled Hough Transform (EHT) is adopted for circular features[1]. Pre-processing and post-processing (refitting) has been also optimized and a function of extracting linear features such as wrinkle ridges, grabens, and rills has been added. This tool is prepared for LISM [2][3][4] / TC (Terrain Camera [5]), Kaguya (SELENE) [6]. Verification of this tool with MOLA DTM and preliminary results for Kaguya DTM are shown. EHT has shown a strong tolerance for noises and modifications; overlaid by other craters, partly eroded from them, large collapse of crater rims.

Craters (circular features) recognition is a hot field for planetary science and computer science. Various approaches have been proposed, and they can be classified by input data; images and DTMs. The former researches are Hough Transform [7], Fuzzy Hough Transform [8], Template matching [9], or Learning algorithm [10]. On the other hand, a few researches have been found for the latter one, only that of Hough Transform [11][12]. There typical crater recognition rates range from 60 percents to 80 percents. Our tool shows the similar value and the verification with the size-frequency distribution of craters from a viewpoint of handling craters in planetary science.

Comparison of size-frequency distribution of craters between automatic results and manual one shows that the shape of plots is reliable in spite of a little systematic decreasing.

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