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Photogrammetric study of selected lunar regions with SMART-1 AMIE data

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The Advanced Moon Micro-Imager Experiment (AMIE) camera onboard SMART-1 spacecraft imaged a number of lunar sites during lunar science phase of the mission (year 2003-2006). There were performed several spot-pointing campaigns during lunar phase of SMART-1 mission when spacecraft was moving along its orbit being directed at the specific sites. During these campaigns several sites were successfully imaged in wideband filter under constant sun illumination but varying viewing angle. Such conditions are the most appropriate for the photogrammetric studies of the surface. Using these datasets we constructed new digital elevation maps for several lunar sites imaged by AMIE camera. These maps open new possibilities for documenting the geological processes and regolith reworking, studies of impact craters and basins.

In this study we present topographic maps for 4 sites: 1) Gruithuisen domes area, centered at 39.5 W, 35.8 N; 2) crater Lavoisier - 80.8 W, 38.2 N; 3) Eastern Aristarchus and its proximal ejecta zone; 4) part of Aristarchus Plateau north to Schroter Valley, 53.0 W, 26.4 N. We calculated detailed topographic profiles over flanks of Gruithuisen hills supposed to be of volcanic origin and Gruithiusen B crater. We found that the floor of large pre-Nectarian cracked-floor crater Lavoisier is not flat - the northern part of the floor is raised up to $\sim$300 meters relatively to its southern part. We note different elevations of ejecta parts in the eastern proximity zone ($\sim$1 radius) of Aristarchus crater, this fact point to a presence of thick ejecta blankets around the Aristarchus. Our data for the part of Aristarchus Plateau do not show great elevation differences for the Aristarchus ejecta blankets and secondary craters.