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Assessment of ≈5,000 Mars-wide CTX DTMs created using the EU-FP7 iMars CASP-GO system

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3D surface imaging of Mars has been revolutionized over the last 13 years with systematic stereoscopy from HRSC. Digital Terrain Models (DTM) and Ortho-Rectified Images (ORI) are produced for approximately 50% of the Martian surface. In the scope of the iMars project, DLR together with the HRSC science team, produced 3D HRSC mosaics for large regions comprising of about 100 individual strips per region (MC-11E/W) [2]. UCL processed full coverage of DTMs over the South Polar Residual Cap (SPRC) and started working on the North Polar Layered Deposits. UCL developed an automated processing chain for CTX and HiRISE 3D processing to densify the HRSC dataset with corresponding DTMs down to 18m and 75cm, respectively, adapting the open source NASA Ames Stereo Pipeline [1]. Some 5,000 CTX DTMs + ORIs were processed using the Microsoft Azure® cloud and an in-house Linux cluster. Around 30 HiRISE stereo-DTMs have also been processed but these are not the point of interest here. Where HRSC DTMs were available, an intercomparison with these HRSC products is performed. MOLA DTM and profile data is too coarse for this purpose (463m/pixel or a 170m footprint every 300m) but HRSC is co-registered to MOLA.

An evaluation was performed by volunteers* of a subset of 1542 CTX DTMs as to their quality in 5 different groups as well as an assessment whether striping was present (1-2m differences). The vast majority of DTMs are in the first 3 classes with only 6% in the poor quality class. An evaluation of this quality is being performed using deep learning techniques which is described elsewhere (Putri et al., this conference).

All of these new products are visualized through an OGC-compliant webGIS developed at FUB [3]. A demonstration will be given of their distribution, quality as well as different applications of these DTMs. The CASP-GO system is planned to be released through github and the release mechanism will be described for planetary scientists to produce further DTMs and co-registered these to HRSC level-4 products.

[1] Tao, Y. & J.-P. Muller LPSC16-2074; [2] Gwinner, K. et al. EPSC15-672; [3] Walter et al., EPSC17.

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