



Quantitative planetary geomorphology with stereo images from the High Resolution Stereo Camera (HRSC) on Mars Express

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The High Resolution Stereo Camera (HRSC) onboard ESA's Mars Express mission is the first fully operational instrument to simultaneously obtain satellite images of a planetary surface in high spatial resolution (up to 12.5 m/pixel), in colour and, perhaps most important, in stereo. These data can be processed to gridded Digital Elevation Models (DEM) and corresponding colour orthoimages. Such images, covering huge areas (a single HRSC image sequence can cover $>100,000$ km²), constitute an excellent remote sensing data base for a large number of geomorphological analyses. Our knowledge of both endogenic and exogenic surface processes on Mars greatly benefits from their analysis. In particular, the morphometry of small-scale features can be much better determined with HRSC data than with previous topographic data with lower spatial resolution. An example is the improved estimation of water discharge through fluvial channels if the topography of that channel is known with high accuracy. Published results based on HRSC data cover a wide range of landforms, including tectonic, volcanic, fluvial, lacustrine, glacial, and periglacial features. HRSC was originally designed for planetary exploration, but has also been successfully adapted to terrestrial airborne operations.