



Detection of block movements in ortho-rectified HiRISE images of the north pole of Mars

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We are working toward automatically identifying new and disintegrated blocks at the foot of the steep north polar scarps of Mars. This region has been closely monitored by High Resolution Imaging Science Experiment (HiRISE) over the past 9 years. Repeated imaging revealed that mass movement events are very common at the steep margins of the polar cap. The most frequently observed events are block movements, which originate at the North Polar Layered Deposits (NPLD) or at the Basal Unit (BU). Blocks come to rest intact or after breaking up into smaller fragments. Their original sizes are in the order of a couple of cubic meters. We have manually identified hundreds of single-block movements as well as events involving a large number of blocks and are currently developing a process for detecting these automatically. First we accurately locate the events by ortho-rectifying the images using HiRISE Digital Terrain Models (DTMs). Then we use the resulting co-registered images taken at different times as the basis for change detection, at which stage we focus on retrieving the size and shape of the moved blocks in order to classify them according to specific geometric criteria. These results can be combined with the corresponding DTMs to estimate the volume of the mass movements.

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