

CONTROL ID: 2538731

TITLE: Frequency of block displacements at the north pole of Mars based on HiRISE images

ABSTRACT BODY:

Abstract (2,250 Maximum Characters):

We identify active block displacements at the foot of the steep north polar scarps of Mars and estimate the frequency of these events in order to estimate the erosion rate and improve our understanding of the evolution of the north polar cap. Thousands of single-block movements and events involving multiple blocks have been captured within 10 years of repeated high resolution imaging of the margins of the north polar cap by High Resolution Imaging Experiment (HiRISE). These blocks, which are up to a couple of cubic meters in size, become detached either from the North Polar Layered Deposits (NPLD) or the Basal Unit (BU) (Russell et al. 2010) and come to rest intact or after breaking up into smaller fragments.

We detect the new blocks automatically in co-registered images taken at different times. We ortho-rectify the images with HiRISE Digital Terrain Models (DTMs), which we produce with Ames Stereo Pipeline (Moratto et al., 2010). We focus on retrieving the frequency of the events as well as the sizes and shapes of the moved blocks. Our results suggest that rock falls are presently an important, regular recurring seasonal process for certain areas of the north polar scarps. Estimates of the volume of the mass movements and thus erosion rate are supported by analysis of corresponding DTMs.

The research leading to these results has received funding from the European Union's Seventh Framework Programme (FP7/2007-2013) under iMars grant agreement n^o 607379.

CURRENT CATEGORY: Other

CURRENT : None

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