

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. This will help us improve our knowledge of the erosion rate and evolution of the north polar cap. Thousands of single-block movements or events involving multiple blocks have been captured within 10 years of repeated high resolution imaging of the north polar cap's margins 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) [1] 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. For the co-registration we use Ames Stereo Pipeline [2] to produce HiRISE Digital Terrain Models (DTMs) and ortho-rectify the images on these DTMs. 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 hence the 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° 607379.

References:

- [1] Russell et al., Landslide erosion rates of north polar layered deposit cliffs and the underlying basal unit, Eighth International Conference on Mars, 2014
- [2] Moratto et al., Ames Stereo Pipeline, NASA's Open Source Automated Stereogrammetry Software, LPSC, 2010

CURRENT * CATEGORY: Other

CURRENT : None

AUTHORS (FIRST NAME, LAST NAME): Lida Fanara^{1,2}, Klaus Gwinner¹, Ernst Hauber¹, Juergen Oberst^{1,2}

INSTITUTIONS (ALL): 1. German Aerospace Center, Berlin, Germany.
2. Technical University of Berlin, Berlin, Germany.