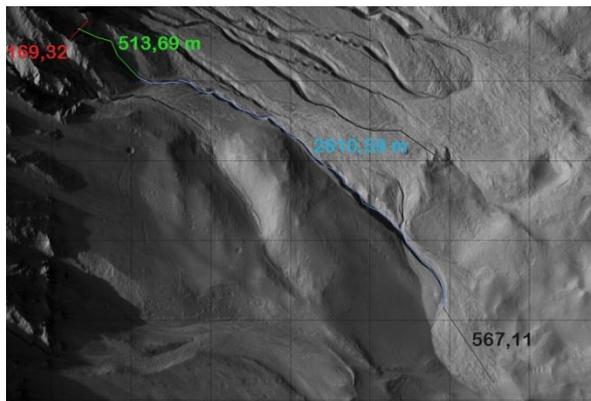


CONNECTION BETWEEN THE GULLY LENGTH AND LATITUDE ON MARS. Z. Barabas, Student (Bsc) of Eötvös Lorand University of Sciences, e-mail: barzoltan88@gmail.com

Introduction: Malin and Edgett [1,2] initially described a class of young features on Mars, that they termed gullies. Recent results [3] shows they are active today [4]. Their analysis is important as might be connected to liquid water [5]. When I studied this young structures on HiRISE images, I noticed that the full length of the gullies grows with the increasing latitude. And not only the length of the gullies but also the width of the alcoves increases too with this trend.

Data and methodes: 21 HiRISE images from the mid-latitude (where the highest concentration of gullies occurs) southern hemisphere of Mars (30°S-60°S) were used for this study. I choosed this 21 craters randomly, and all of them contain gullies. More than 70 gully length and alcoves width were measured directly from those HiRISE images, in Surfer software. I measured the length of the gully from the top of the alcove to the end of the debris apron. The error of the measurement are maximum 11-15 meters, because the scale of the images are small (I used the small HiRISE jpeg files. e.g: ESP_123456_1234_RED.abrowse.jpg).

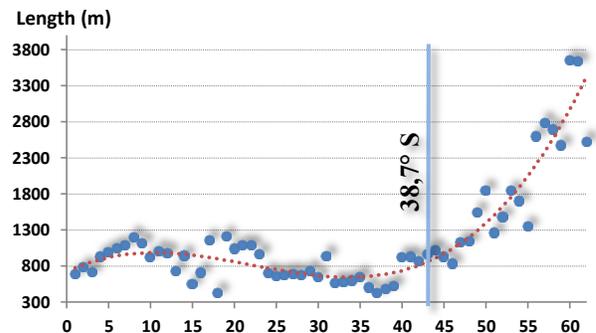


1. figure: Methode of measurments - Red – width of alcove, Green – length of alcove, Blue – length of channel, Black – length of debris apron

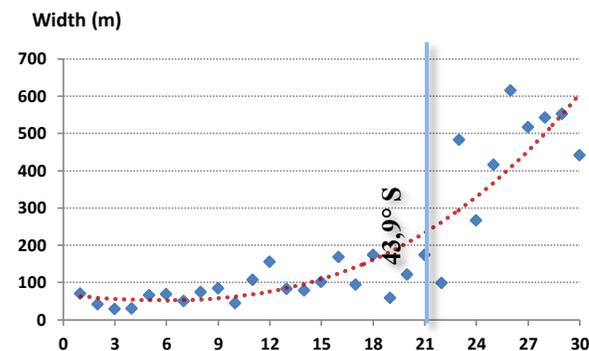
Gully length and alcove width: The survey contains 70 gullies (I removed 8, which theoretically could be produced by anomalous topography), so we can observe a general increase in the length of the gullies, from the 38° latitude. From this point, the shorter gully length can also reach the 1000 m. Alcove width of gullies are changing too. Above 50°S, it's not rarely when an alcoves reaches the 500 m in width, but sometimes even 1997 meters. Between 30°-40°, the largest alcove measured width, was 175 m. At higher latitudes can larger gully size may form, because the solar radia-

tion is weaker, and the water ice supply is larger than the lower latitudes. So in topographic lows (such as alcoves and gully channels) more water ice could be trapped and accumulated in unit of time, without melting. And when it melts, produces more meltwater, that emanates from within the alcove causing bigger headward erosion to create the larger alcove structures. This larger amount of meltwater can get farther before it freezes, and it flows downslope to carve the channels and any debris that may be mobilized is deposited in the debris apron.

Length of gullies



Width of alcoves



2. figure: Length of the gullies and the width of the alcoves - The x-axis shows the number of the gullies. The latitude is not increased linearly with the numbering, because one crater contains more than one gullies. From the blue lines observed a strong increase in the size.

References: [1] M. Malin and K. Edgett, Science, 288, 2330, 2000; [2] M. Malin and K. Edgett, JGR, 106, 23429, 2001; ; [3] Hauber et al. 2011 Geol. Soc London. Spec Publ. 356, 111-113; [4] Reiss et al. GRL 37, L06203; [5] Kereszturi 2012. Astrobiology 12, 586-600.