Ice related landforms in crater Hale and its relation with sun energy. M. G. Spagnuolo[1], D. A. Winocur[1], M.. Mantegazza[2] and A. Rodriguez, [1]IDEAN (UBA-CONICET) (mgspag@gmail.com), [2]FCEyN, UBA.

Introduction: Hale crater is a large complex crater formed at the source region of Uzboi Vallis, along the northern rim of the Argyre basin within the Nereidum Montes region and is one of the largest martian impact craters presently known to have generated channels that radiated outward from the impact site [1]. Hale crater reveal lots of evidences of ice related landforms such as rock glaciers, moraine deposits [2,3] and gullies related to ice melting processes [4]. Nevertheless, there is still some controversy since the lack of identification of water ice, plus some discussions in relation to the gullies formation and presence of water. Here we attempt to make a details map of landforms in Hale crater, describing them in the view of terrestrial analogs that have a clear water ice origin. We also use make an insolation analysis to determine if there is a correlation between those features and the energy received [5].

Landforms mapping: Using CTX base images and HIRISE we identified ice related landforms. We then compared each landform with a terrestrial analog, mainly from Iceland (Fig.1). After the identification of each landform, we plot in a GIS the location of each one. Between the landforms we recognized rock glaciers in, thermokarst, solifluction lobes, polygonal patterns and moraines [6].

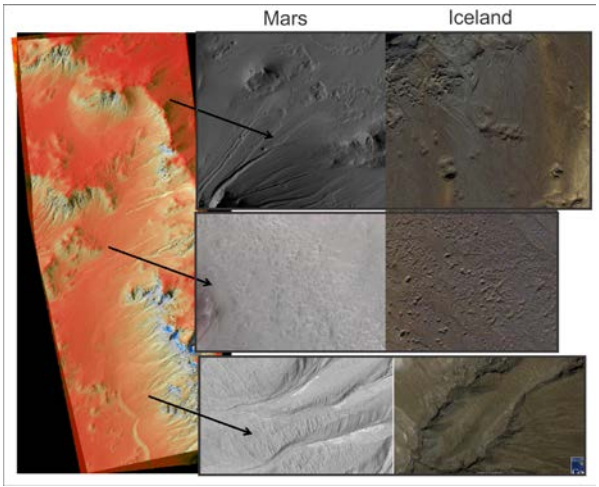
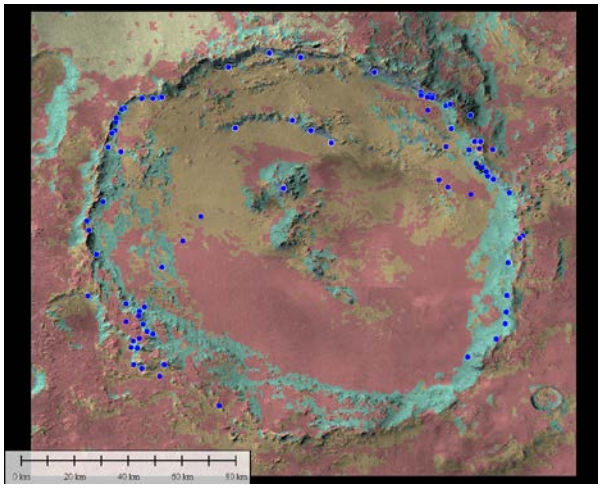


Fig. 1: Comparison between ice related landforms in Mars and Iceland.

Illumination Analysis: For the solar flux we used the MarsLux code [5] for a hole Martian year making a calculation every half hour. With the results we generated maps of mean energy, maximum, minimum and number of intervals between light and darkness. Using this results together with derived slope maps and topography we implemented machine learning technics in R to generate a final map with 5 classes. This five classes correspond to specific illumination parameters and topographic characteristics.

Discussions: Preliminary results from the illumination analysis with the map of the ice related landforms we recognized a clear correlation between areas with actual poor illumination conditions and ice related features. Moreover in areas with maximum illumination no distinguish ice related morphologies are observed.



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