KAISER CRATER DUNE FIELDS – A NOVEL APPROACH FOR LANDED OBSERVATIONS OF DYNAMIC POLAR PROCESSES.

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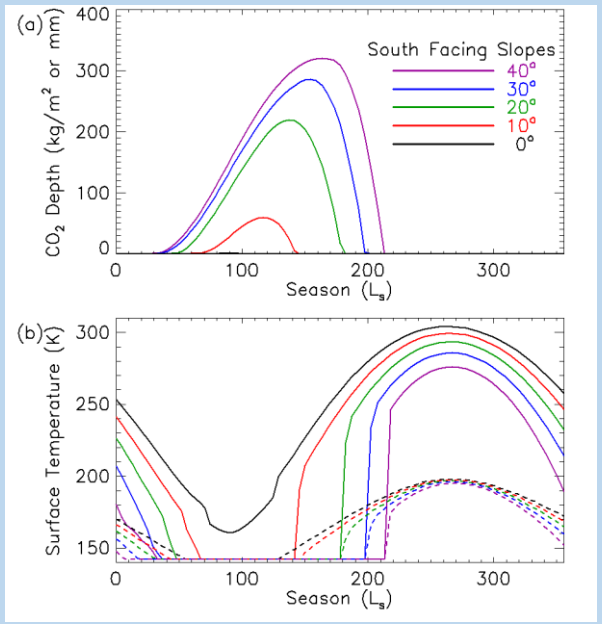

Fig. 1: Modeled conditions for south-facing slopes in Kaiser crater. (a) CO_2 ice column abundance. Assuming the ice is porous with a density of 1000 kg/m^3, the thickness can be shown in mm. (b) Maximum and minimum surface temperatures.

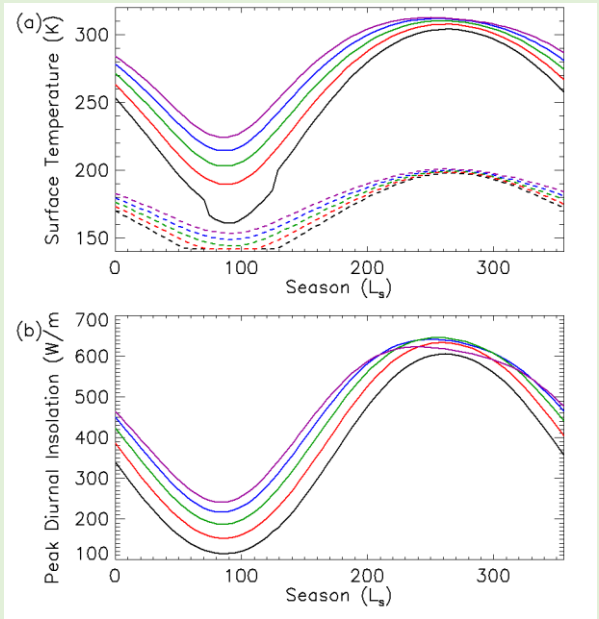

Fig. 2: Conditions for north-facing slopes in Kaiser crater. (a) Maximum and minimum surface temperatures. Near winter solstice (L_s=~90°), diurnal CO_2 ice can form on flat areas. (b) Peak insolation (diffuse and direct) for flat and north-facing slopes..

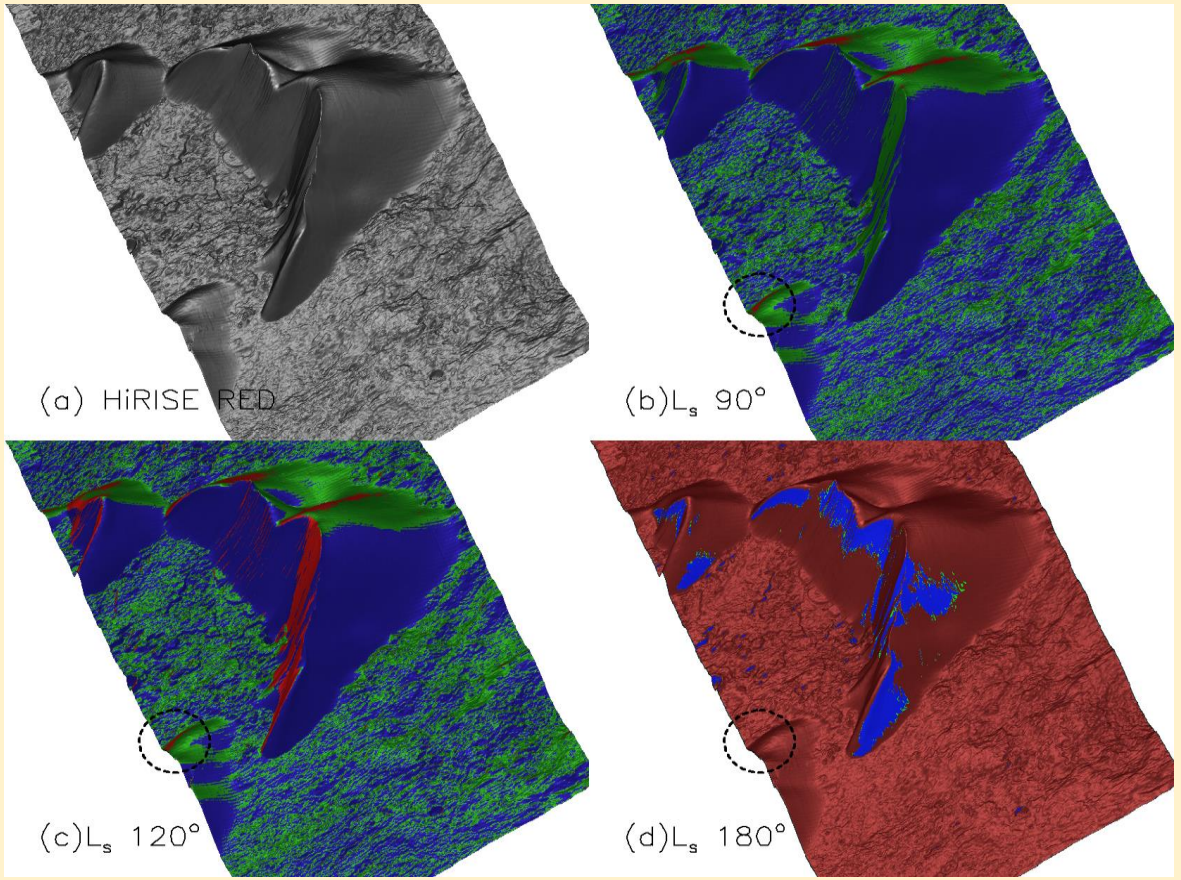

Fig. 3: (a) Kaiser East Barchan (longitude, latitude: -54.27, 12.96) represented using a HiRISE image (ESP_018516_1255_RED) draped on a HiRISE DTM (DTEEC_007018_1255_007229_1255). Kaiser East Barchan at (b) L_s 90°,(c) 120° and (d) 180°. Blue indicates seasonal CO_2 ice. Green indicates thin, possibly diurnal, CO_2 ice. Red indicates ice-free regions. The circle identifies a possible landing site from which to make diurnal and seasonal CO_2 ice and related observations.

Ground-based observations of active CO_2 ice condensation and sublimation and the subsequent interaction with the surface is the next step in understanding the CO_2 cycle on modern dynamic Mars as an agent of geomorphic change. High mid-latitude dune fields, such as the one located in Kaiser crater, provide an opportunity for a landed mission to observe these seasonal processes, while avoiding the most extreme of Martian environments. We understand that several engineering and technological issues remain, but that discussion is beyond the scope of this abstract. https://www.hou.usra.edu/meetings/planetinsitu2022/pdf/7002.pdf