RECENT CLIMATE-RELATED DEPOSITS IN THE SOUTHERN HEMISPHERE OF MARS: A KEY CLASS OF LANDING SITE ENVIRONMENTS FOR THE MARS SCIENCE LANDER. M. A. Kreslavsky, J. L. Dickson, C. I. Fassett, J. W. Head, J.-B. Madeleine, M. A. Ivanov, Dept. Geological Sci., Brown University, Providence, RI, 02912, USA; kreslavsky@brown.edu

Introduction: The science objectives for MSL focus on biological potential, processes of relevance for past habitability, and geological characterization of such sites. Water is a fundamental factor in the origin and evolution of life, and climate change represents mechanisms to transport water across different latitudes and into different environments. We present a class of landing sites that focus on evidence for recent climate change [e.g., 1] and features and structures that represent the accumulation and flow of water in solid and liquid states. We focus on the southern uplands, where latitudinal bands of features (e.g., viscous flow features, gullies, patterned ground, and dissected mantles, [2-4]) suggest the emplacement and flow of water ice, and the presence of local microenvironments that suggest local melting. These features are representative of recent climate change, but also occur in environments where there is ample evidence of longer-term preferential landform degradation by similar processes. Thus, these environments offer the opportunity for access to ancient Noachian rocks that have been involved in abundant water-related processes.

Landing site example: As an example of possible landing site of this key class we propose an unnamed crater at 49°S 14°E. This crater has a flat floor that meets minimal formal engineering constraints for landing. In the southern part of the crater there is a steep-wall mesa of layered material of presumably sedimentary origin. There are easily reachable outcrops of this material at the crater floor. In addition to this old material the landing site provides easy access to different kinds of dissected mantles and patterned ground, partly eroded debris aprons and recent gullies. In-situ morphological studies and probing for the presence of shallow subsurface ice in these features is critical for understanding the fate of water and the nature of climate variability in the last 3 billion years. The landing site also allows sampling of a wide variety of materials, including dark dunes and bright ripples.

This landing site is only an example of a site for study of both old layered deposits and recent water/ice-related features. Further detailed comparison of a number of promising locations is necessary.

References: [1] Head, J. W. et al. (2004) *Nature 426*, 797. [2] Mustard, J. F. et al. (2001) *Nature 412*, 411. [3] Milliken, R. E. et al. (2003) *JGR 108*, 10.1029/2002JE002005 [4] Kreslavsky, M. A., and Head, J. W. (2002) *GRL 29*, 14.

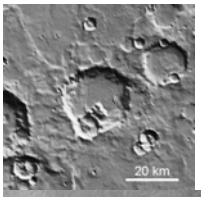
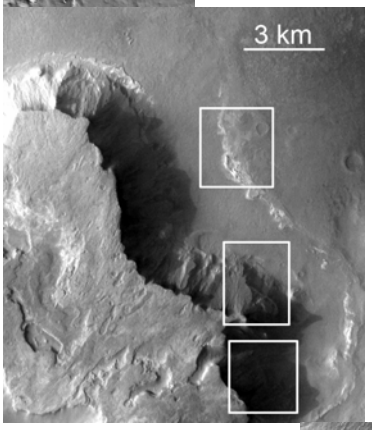


Fig. 1. MOLA shaded topography of the proposed landing site.

Fig. 2. THEMIS VIS image V15028004 showing the mesa in the crater and locations of Figs. 3-5



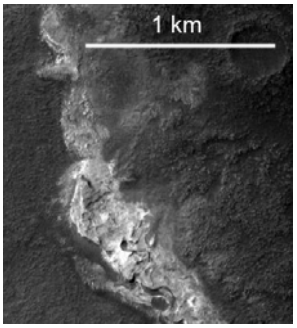


Fig. 3. Outcrops of bright old layered material and young dissected partly or completely desiccated formerly ice-rich mantle.

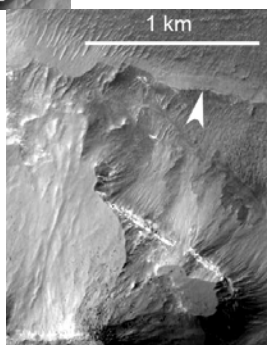


Fig. 4. Walls of the mesa showing layers and partly eroded debris aprons (arrow) that may or may not contain shallow sibsurface ice.

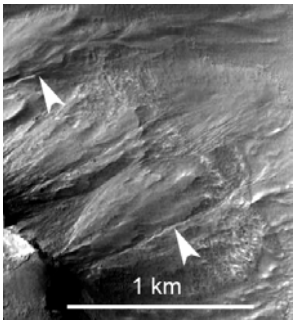


Fig. 5. Walls of the mesa, debris aprons and recent gullies (arrows).

Figs. 3 - 5 are portions of MOC NA image M04/00235.