cipitation and seasonal vapor-phase exchange, and punctuated by isolated occurrences of melting in some microenvironments. This climate is consistent with hydration and weathering of surface sediments by ephemeral thin films of water. Accordingly, hyperarid, terrestrial, polar biological analog environments should be more extensively explored to characterize potential and historical martian habitats. Thermal contraction crack polygons on Mars have been shown to be overwhelmingly a modification process affecting the latitude-dependent mantle (LDM), indicating the spatial dominance of an exceptionally ice-rich substrate in most polygonally-patterned terrains. Pore ice emplaced by vapor diffusion appears incapable of producing excess ice rapidly enough, or in thick enough accumulations to produce the observed polygonal landforms, while primary precipitation of ice, snow, and dust is a plausible mechanism. Lastly, ongoing analysis of local outcrops of the martian LDM will provide key insight into its mode of emplacement and modification, and the history of water and ice in a range of martian microenvironments.

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