Thin liquid water films on present-day Mars

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By correlating the spatial and temporal changes of water ice and temperature distribution on the surface of Mars, we have identified small patches in the southern hemisphere and large ring-shaped zones in the northern hemisphere where the temperature is around or above the threshold limit of interfacial water formation. In the south, between Ls=200° and 220°, water ice is present without CO₂ ice in the small so-called “Dark Dune Spots”, where for the warmest part of the day during Ls 10-20° (~15-30 days) the temperature is between 190 and 220 K. In the north, the receding seasonal CO₂ ice deposits are surrounded by a water ice annulus during winter and spring. The water ice annulus reaches temperatures above 180 K between Ls=280° and 340° (different seasonal periods at different latitude bands). Here the ideal period of time for interfacial water formation spans between 10° and 34° Ls, which is equal to 15 and 45 days. This ideal zone migrates northward as the season progresses toward summer. We outline the basic characteristics of these liquid interfacial water areas and their possible consequences on chemical processes and astrobiological issues.

Method of participation: remote