National Aeronautics and
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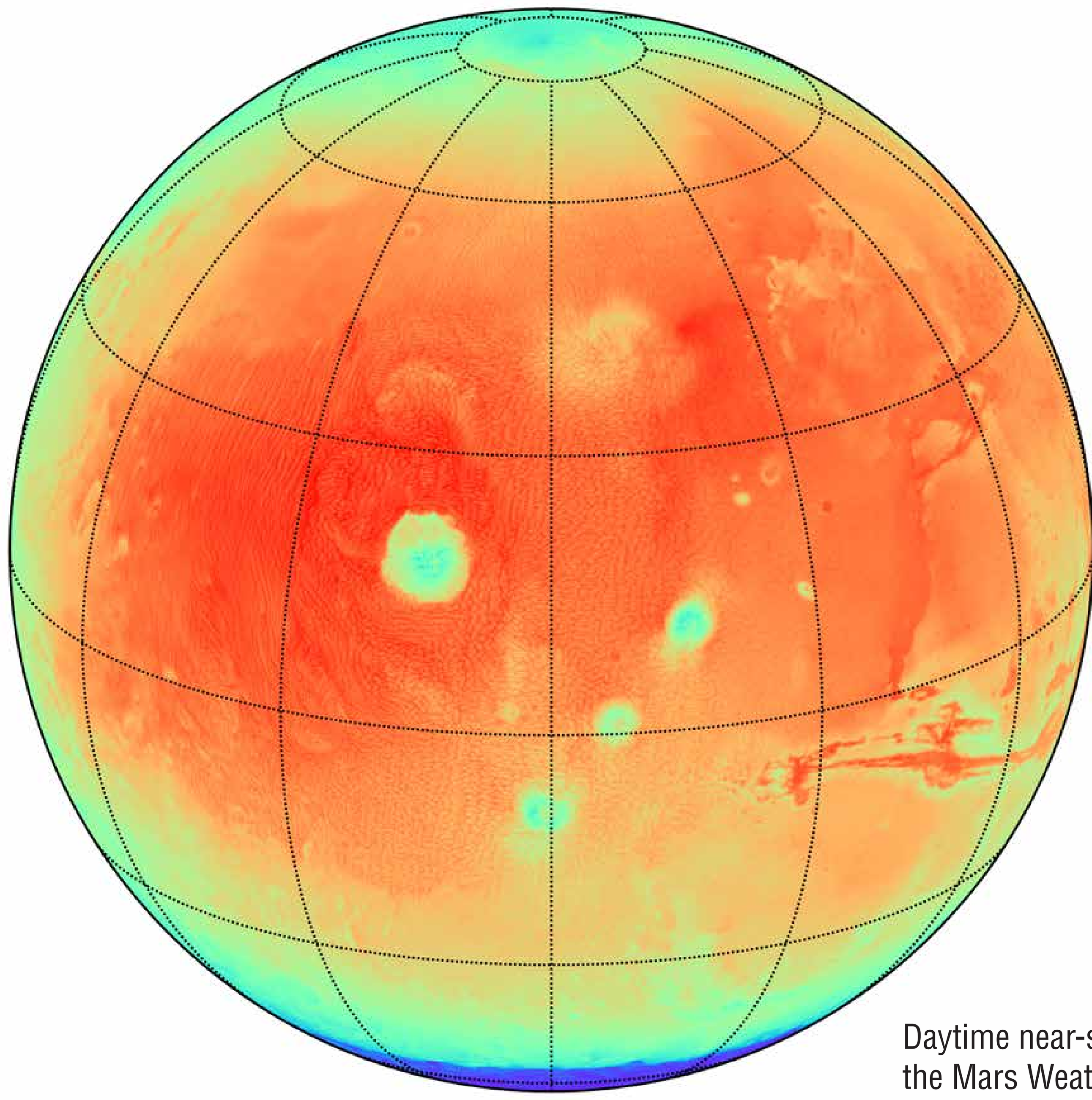
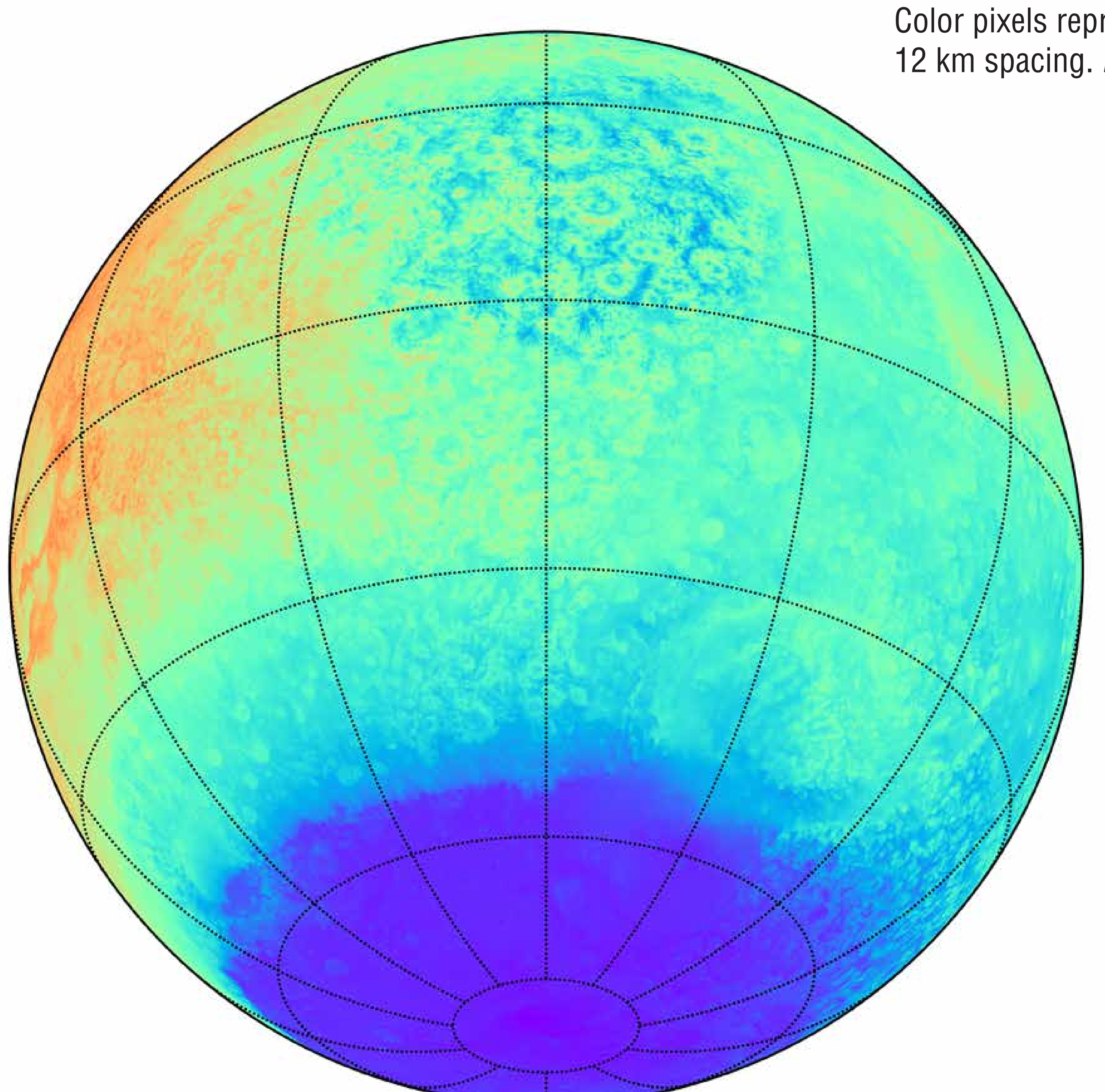


Daytime near-surface (8 meters) air temperature simulated by the Mars Weather Research and Forecasting (MarsWRF) model projected on a globe. Deep blue: 150 Kelvin (K); deep red: 230 K. Major Martian volcanoes are identifiable due to their cooler air temperatures, and appear as roughly oval shapes (upper left: Olympus Mons; aligned at center right: Arsia, Pavonis, and Ascraeus Mons). Lower right: the warmer Valles Marineris. Color pixels represent individual model grid cells at less than 12 km spacing. *Mark Richardson, Aeolis Research*



A view of Mars' southern hemisphere shows genereally cooler nighttime temperatures, and the deep cold of the southern polar night (at bottom). While "streets" and cells of large-scale convective motions are generated during daytime, due to strong surface solar heating, at night subtle patterns of topography and surface thermal properties exert greater control of air temperature. Interactions between small-scale organized motions and larger-scale circulation are crucial for Martian climate processes. *Mark Richardson, Aeolis Research*

Numerically Modeling the Weather and Climate of Mars

Martian meteorology is of both scientific and engineering importance. Mars provides a natural laboratory of extreme weather that challenges terrestrial theory and modeling—with monster global dust storms and extremely rapid transport of material from the surface into the thermosphere. The relatively large number of spacecraft sent to Mars are sensitive to meteorology for deployment (for example, entry, descent, and landing) and operations. Numerical atmospheric and climate modeling on NASA supercomputers contributes to improved understanding of the basic physics of Martian meteorology and improved forecasting of conditions for design and operation of NASA spacecraft.

Mark Richardson, Aeolis Research

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