

Central Mounds on Mars



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Central Mounds

NASA/JPL/MRO/MSSS



- Implications for ancient Martian climate
- Application to the Mars Science Laboratory

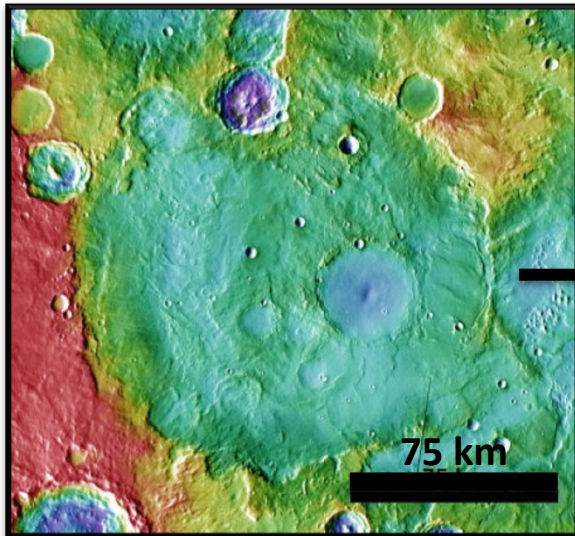
How did central mounds form?



- Sediment filled the entire crater and was then eroded (*e.g.*, Malin and Edgett, 2000)

1. Empty crater
2. Filled entirely to the rim with sediment by some process
3. Another process starts eroding the interior deposits
4. Empty crater

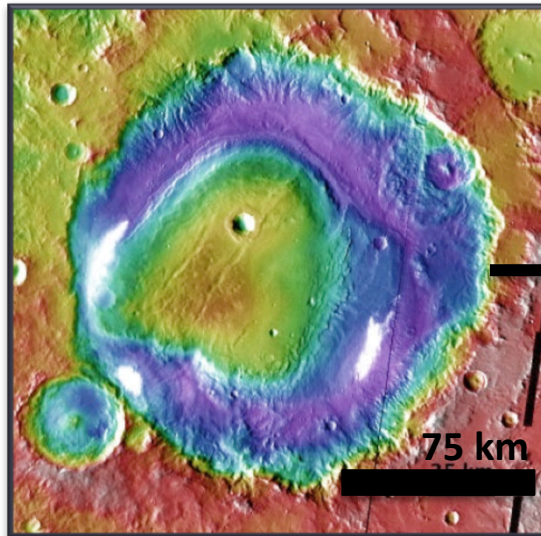
2. Arago Crater



-1.1 km 1.3 km



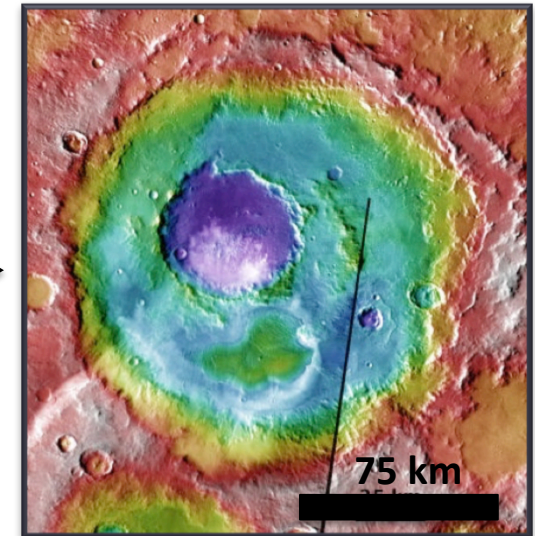
3. Henry Crater



-2.1 km 1.1 km



3./4. Bequerel Crater



-4.6 km -1 km



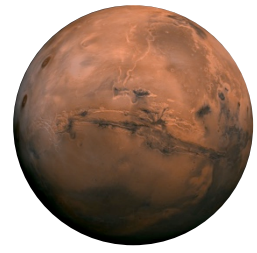
NASA/GSFC/MGS and NASA/
JPL/ASU/THEMIS



Which geologic process(es) created the global population of central crater mounds?

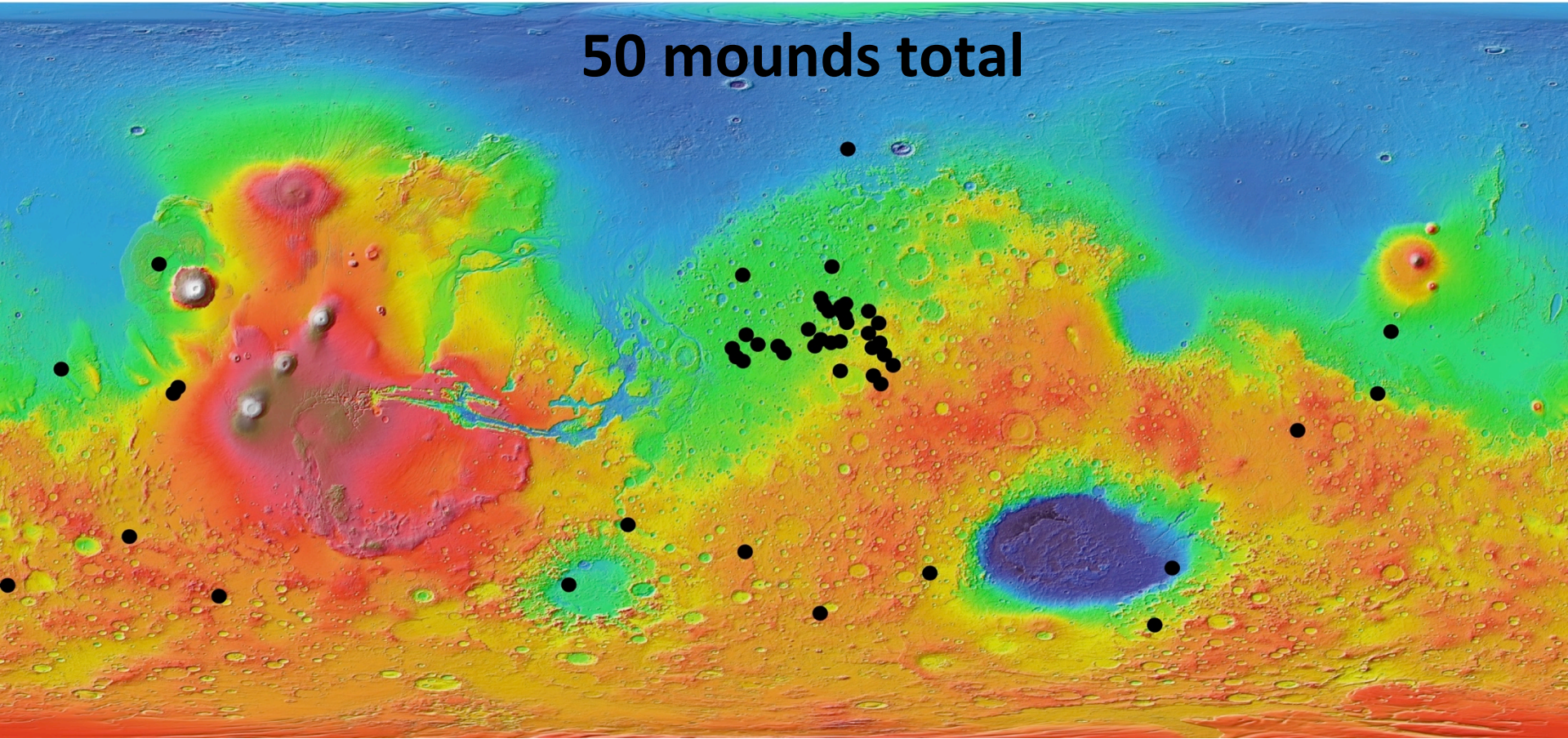
Implications for life: Did conditions conducive to life exist on ancient Mars, and where?

Global Survey

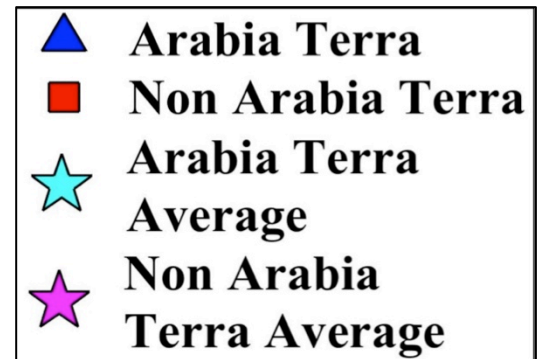
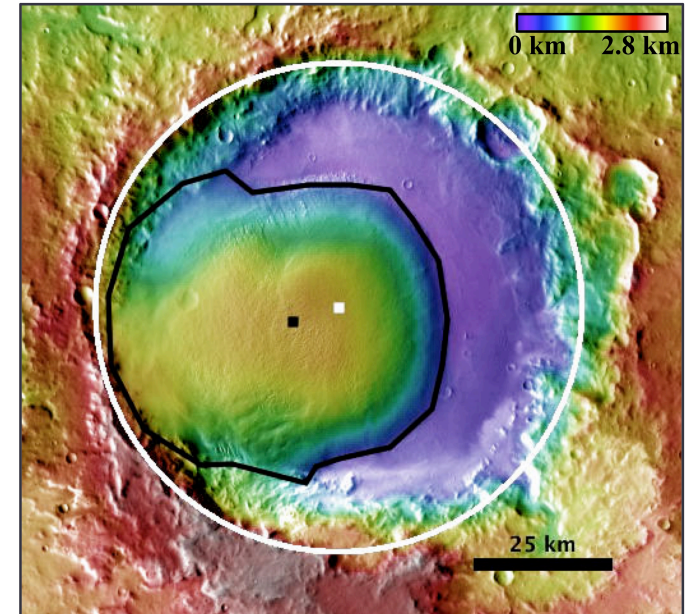
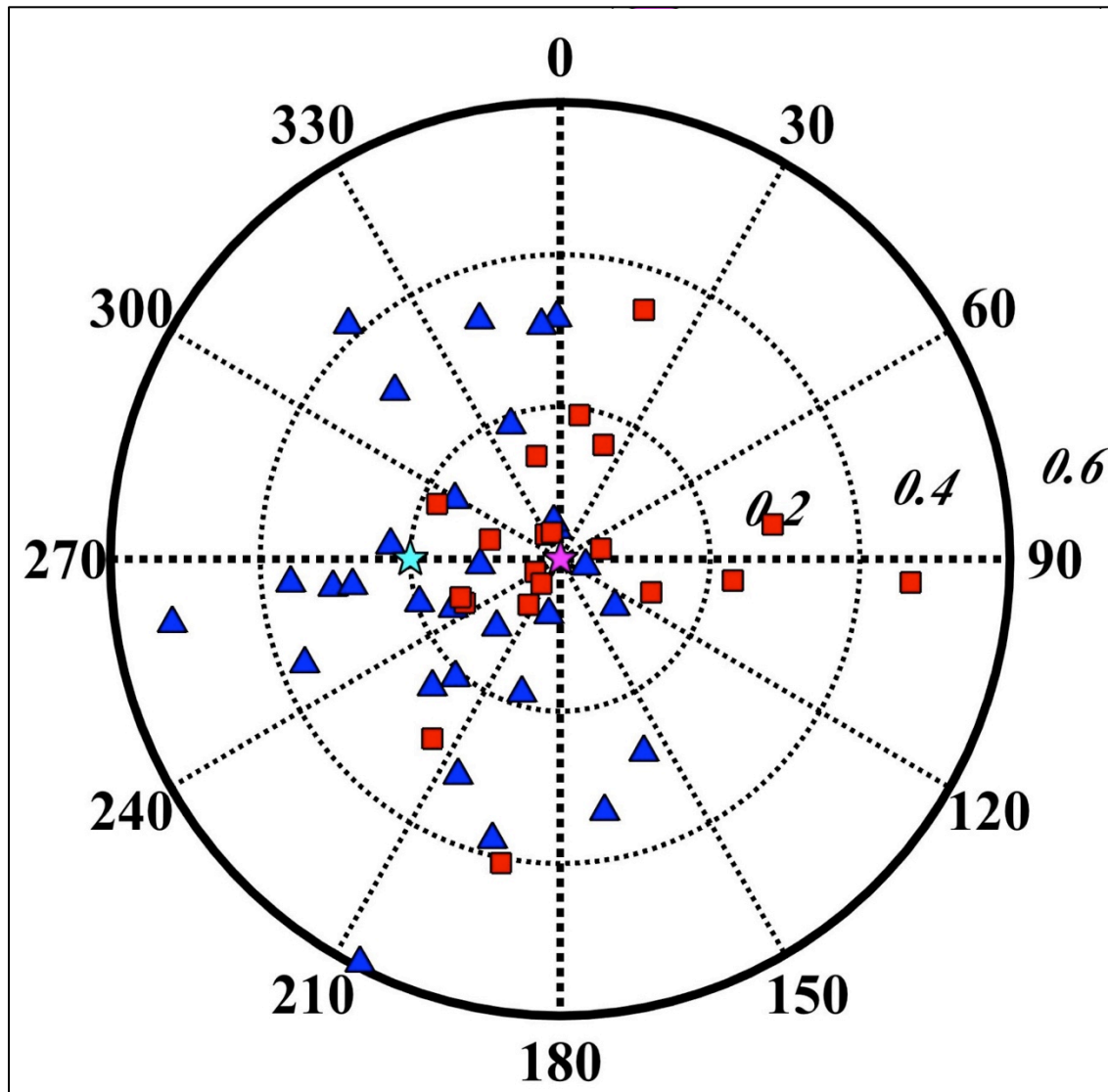


Survey performed for craters > 25 km in diameter that are within $\pm 60^\circ$ latitude

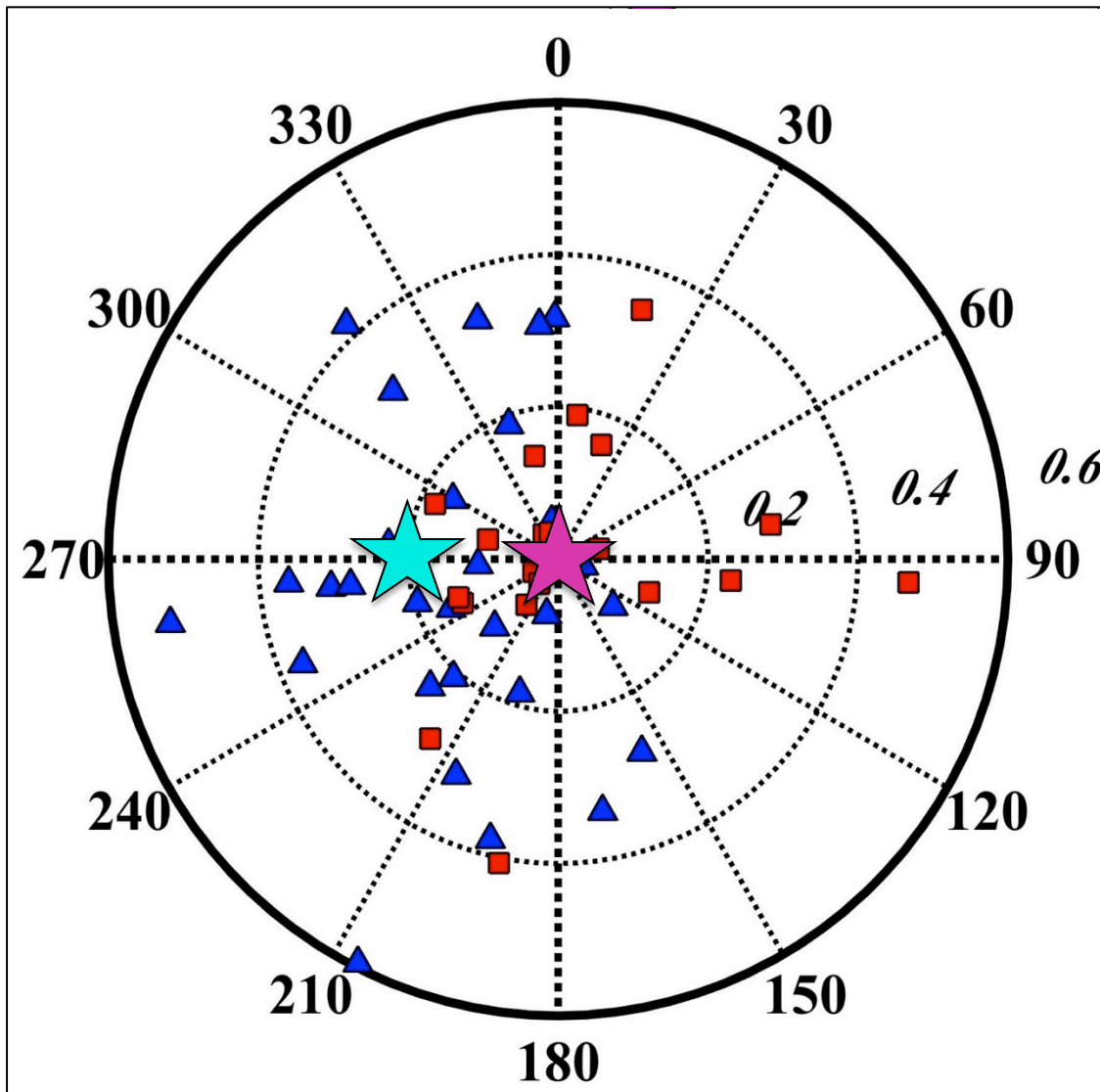
50 mounds total



Mound Offsets



Mound Offsets



- Arabia Terra mounds are offset to the west side of their host crater. This matches the regional wind direction.
- The remaining mounds are not offset in a particular direction.

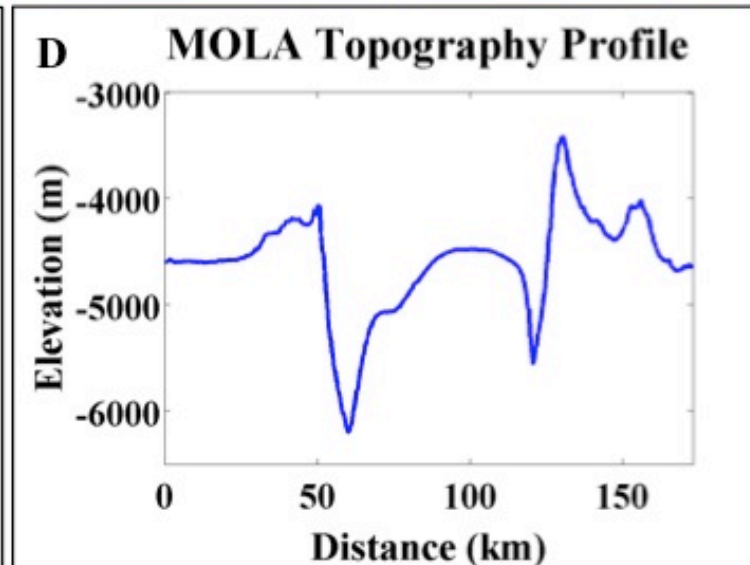
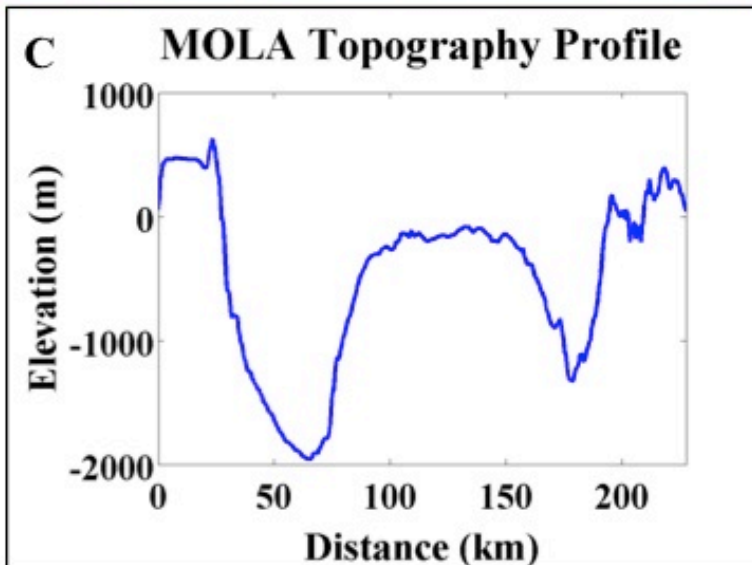
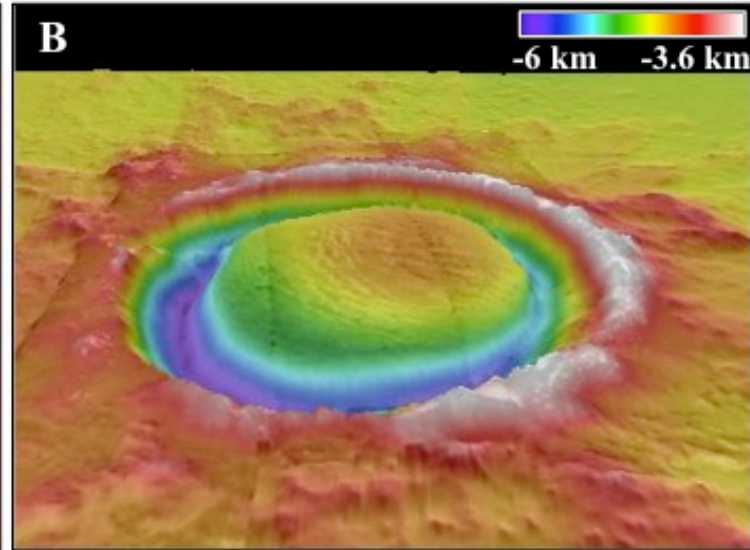
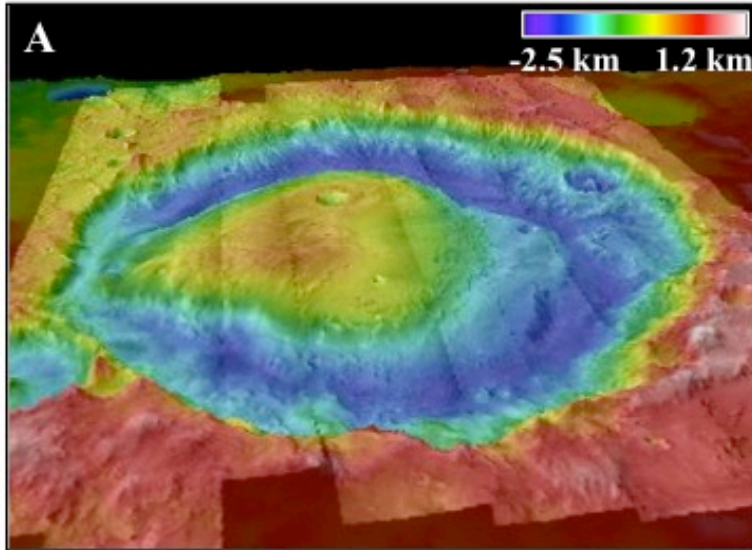


Ice Related Processes



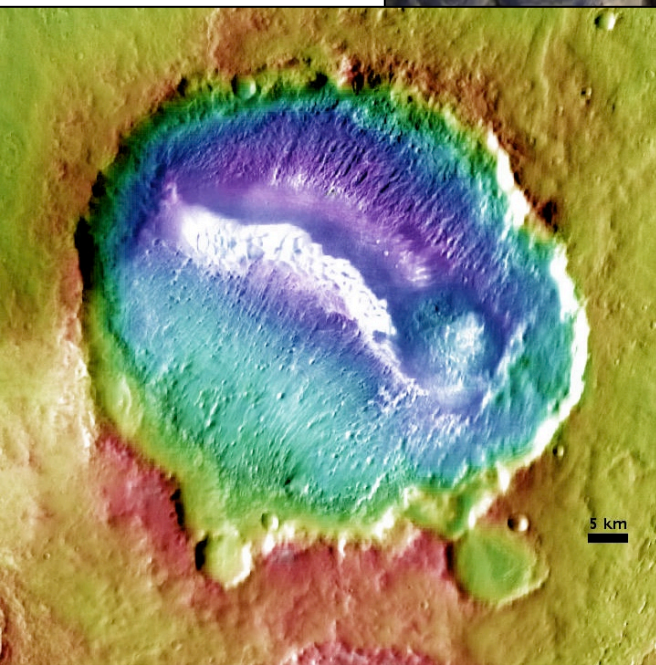
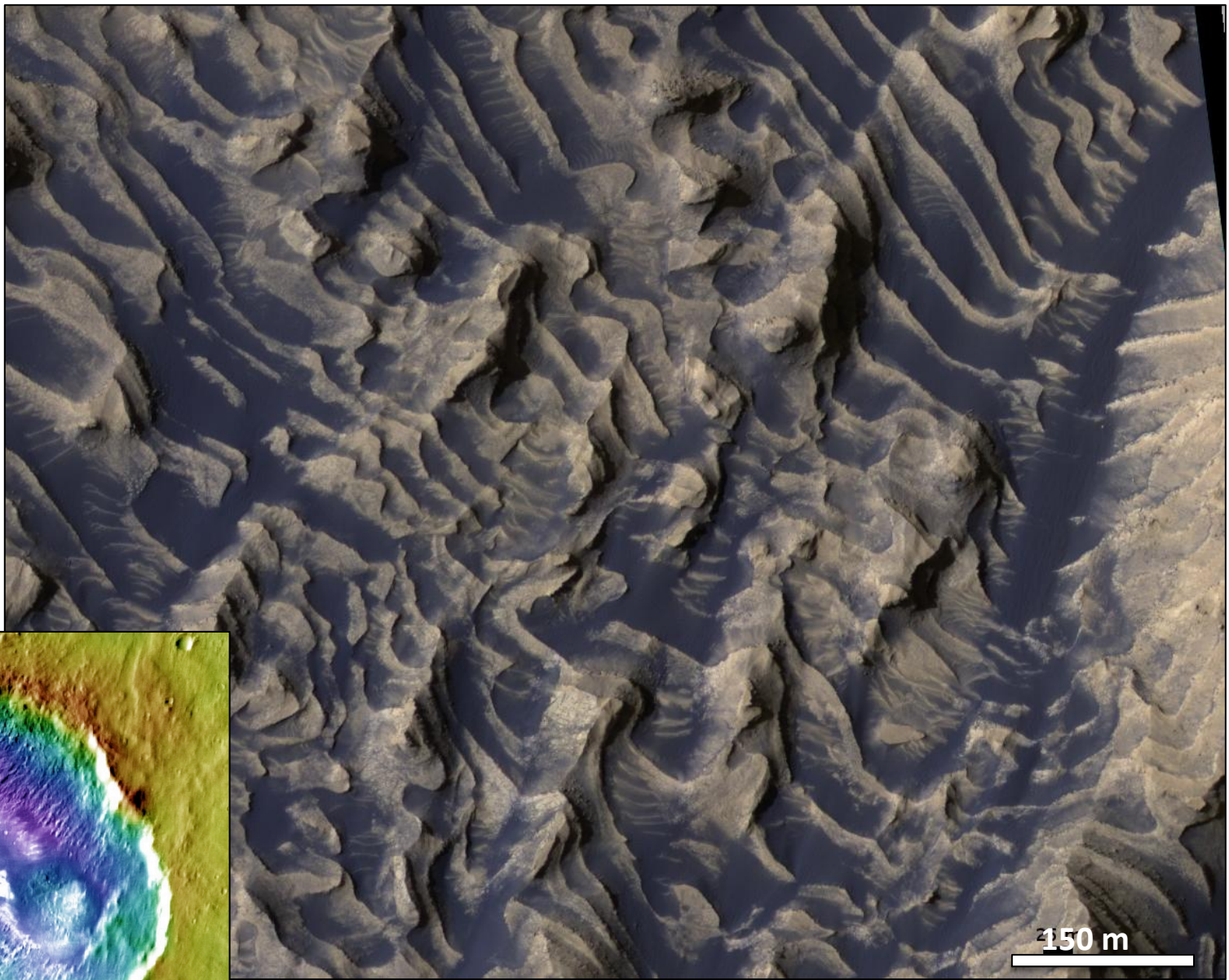
Henry Crater
(equatorial)

Korolev Crater
(polar)



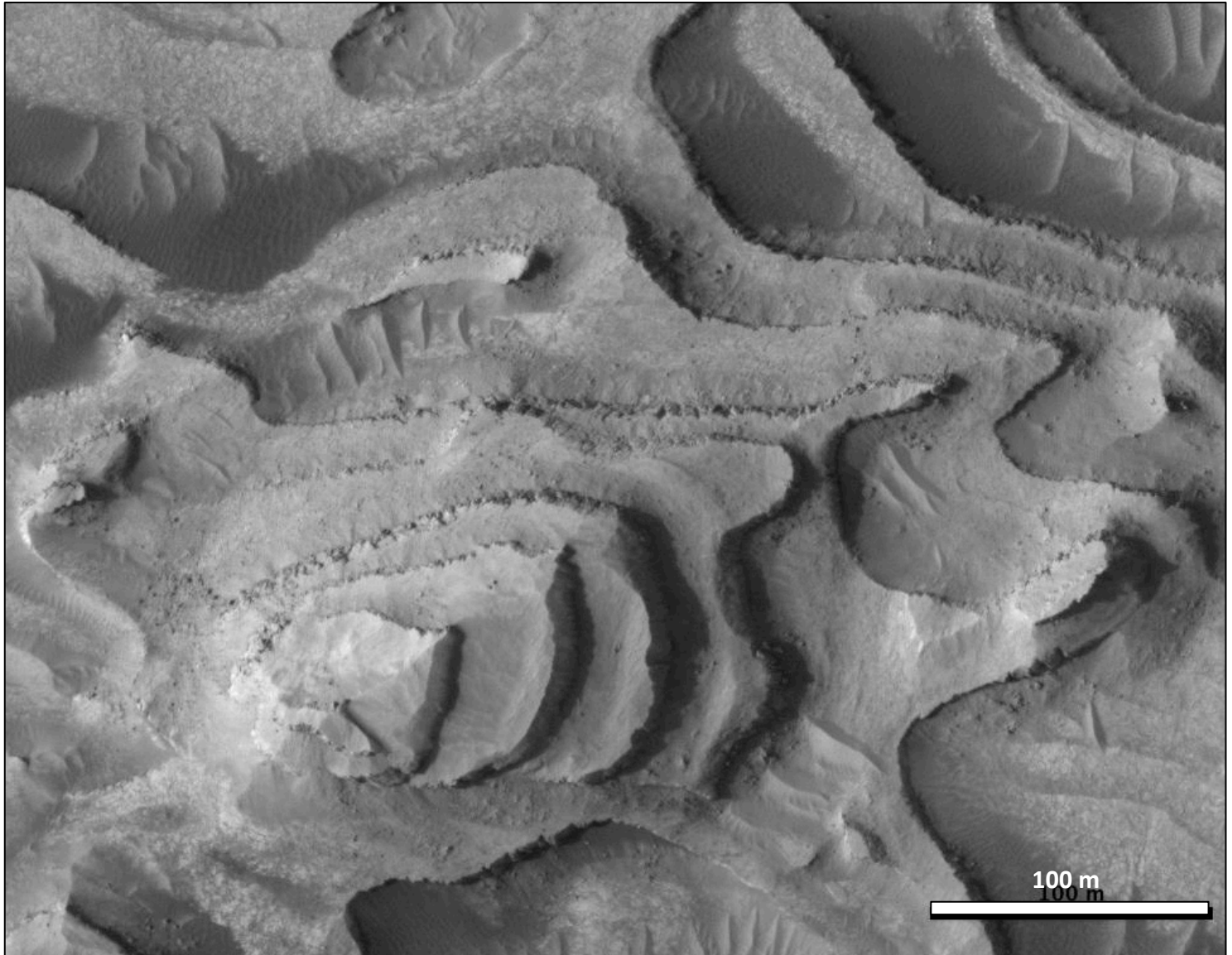
Rhythmic Layers

Characteristics:
-regular
stairstepping
layers



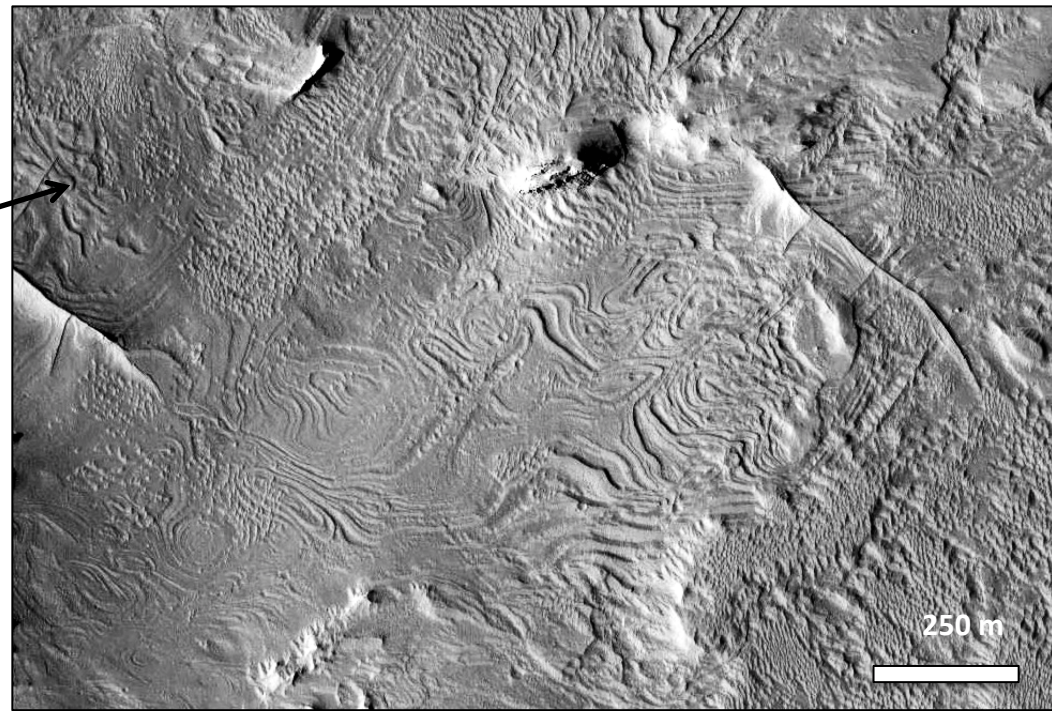
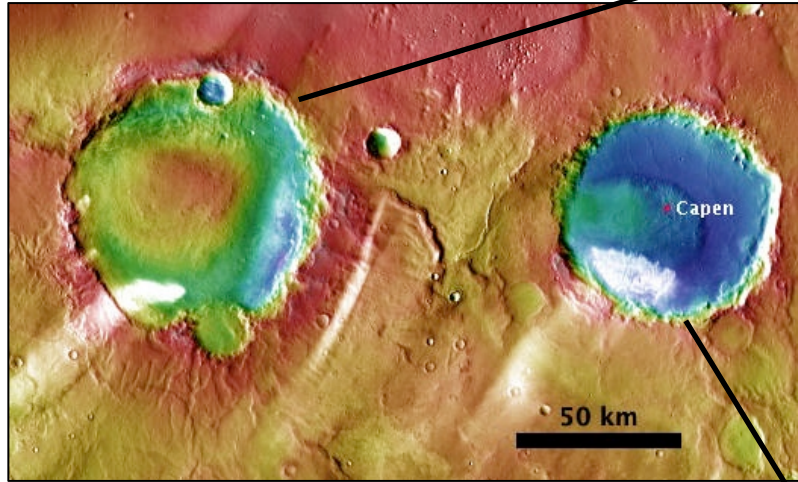
Danielson crater

Rhythmic Layers



Airfall dust? Ice related or aqueous processes related to obliquity cycles?

Wavy Layering and/or Crossbedding



Suggestive of
aeolian processes

