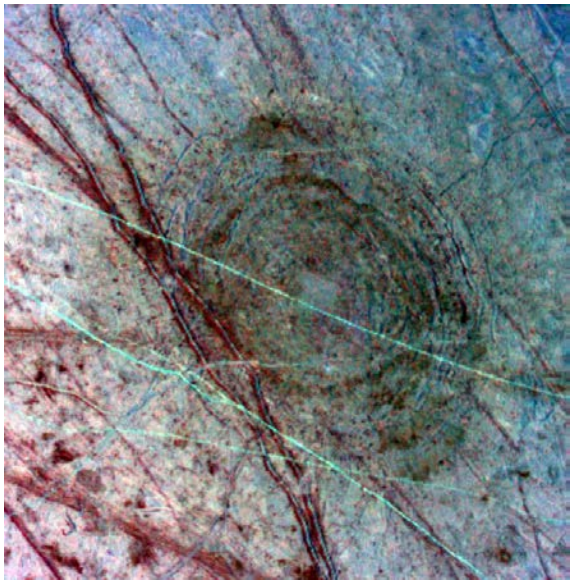
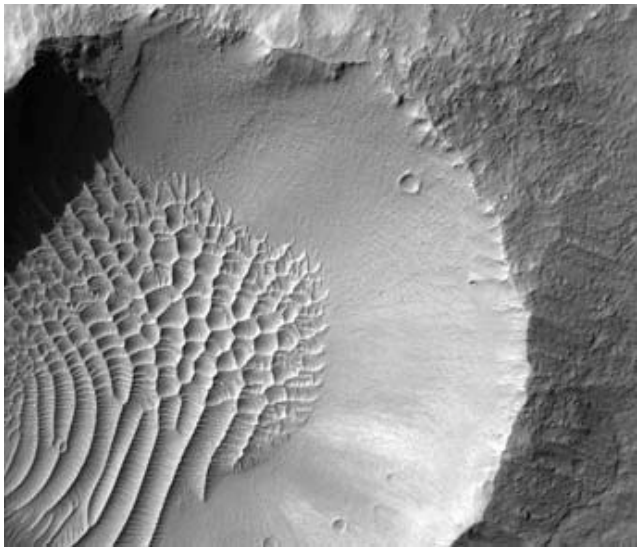
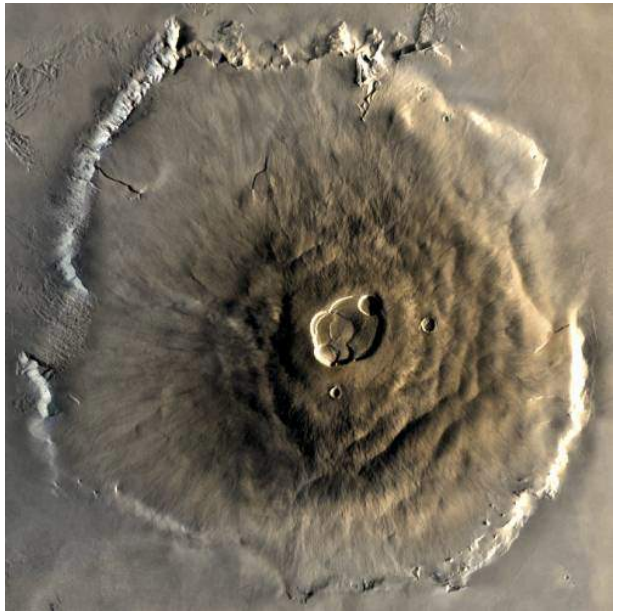
Planetary Surface Processes

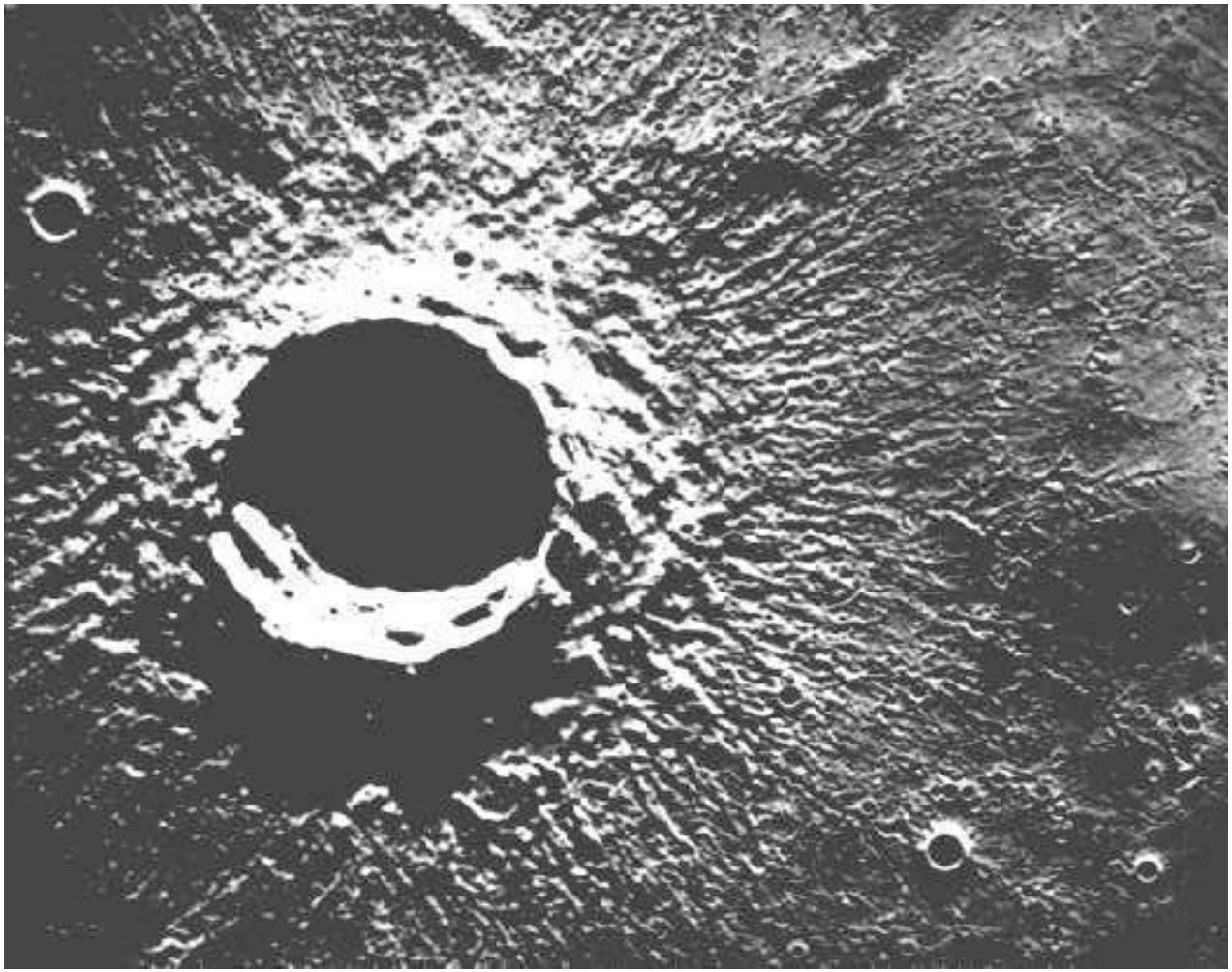
Cratering
Gravity
Tectonics
Volcanism
Winds
Fluvial
Glacial
Chemical weathering







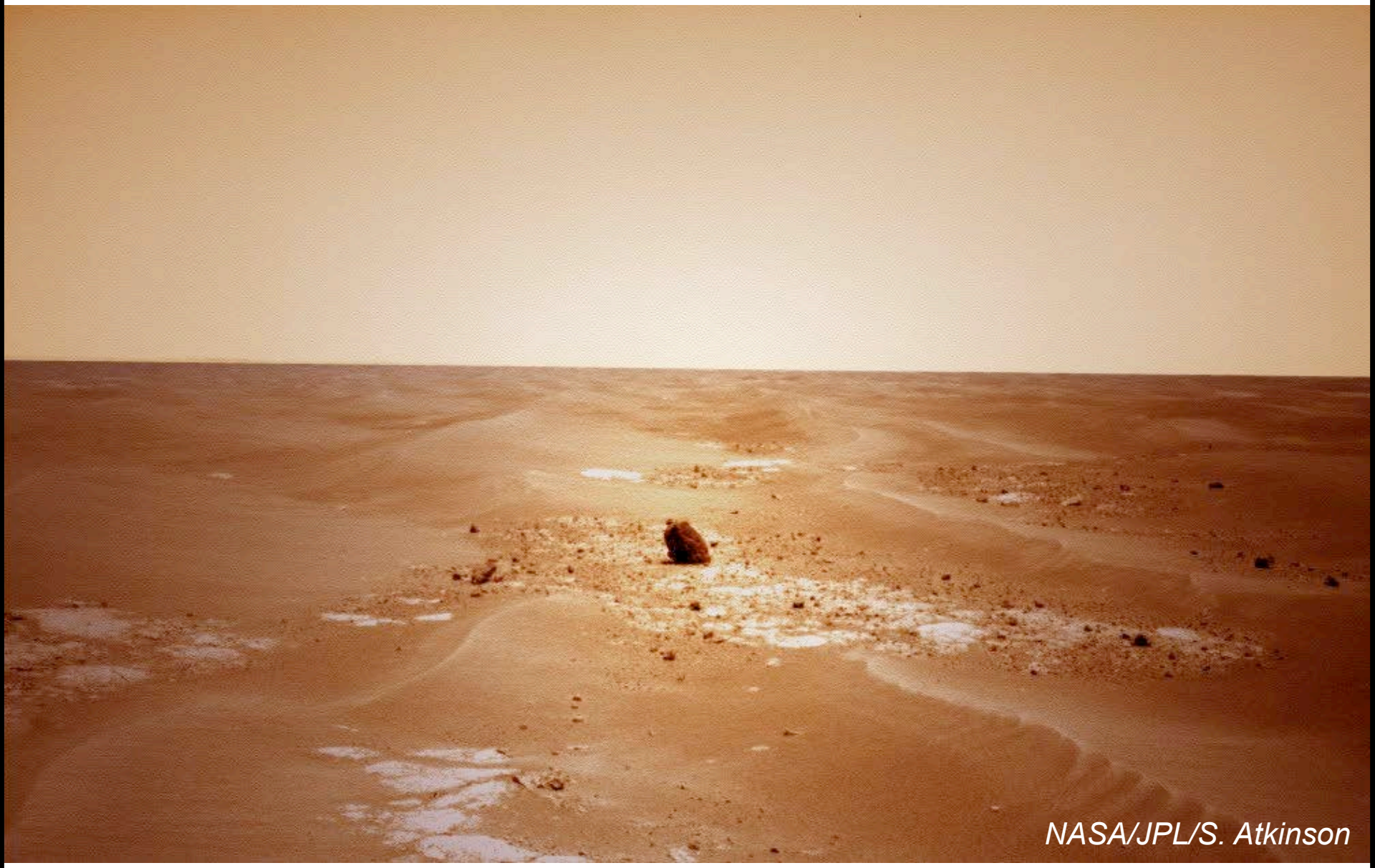
Crater ejecta



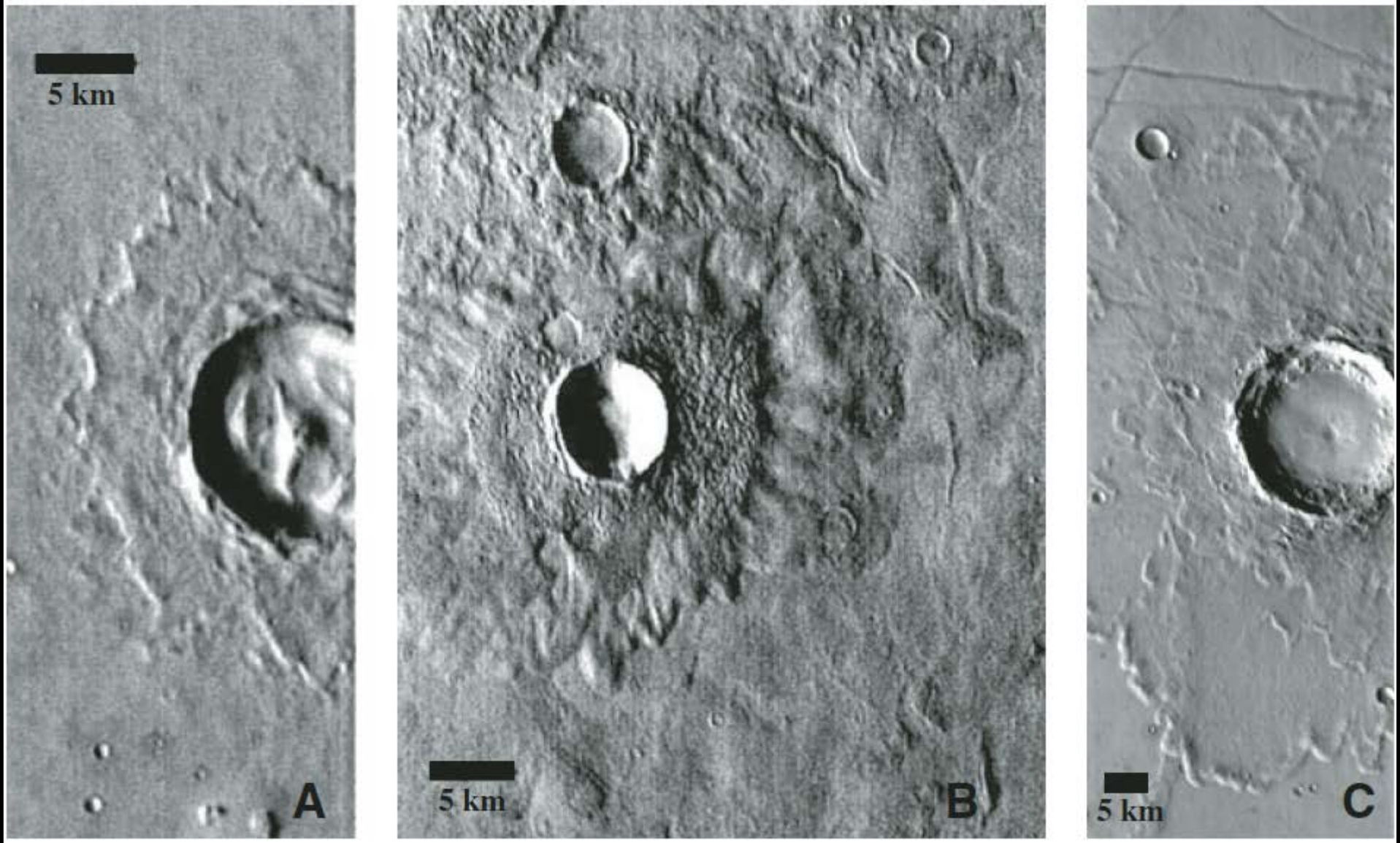
- Continuous and discontinuous ejecta
- Secondary crater chains

Ejecta rays

Marquette Island, Meridiani Planum

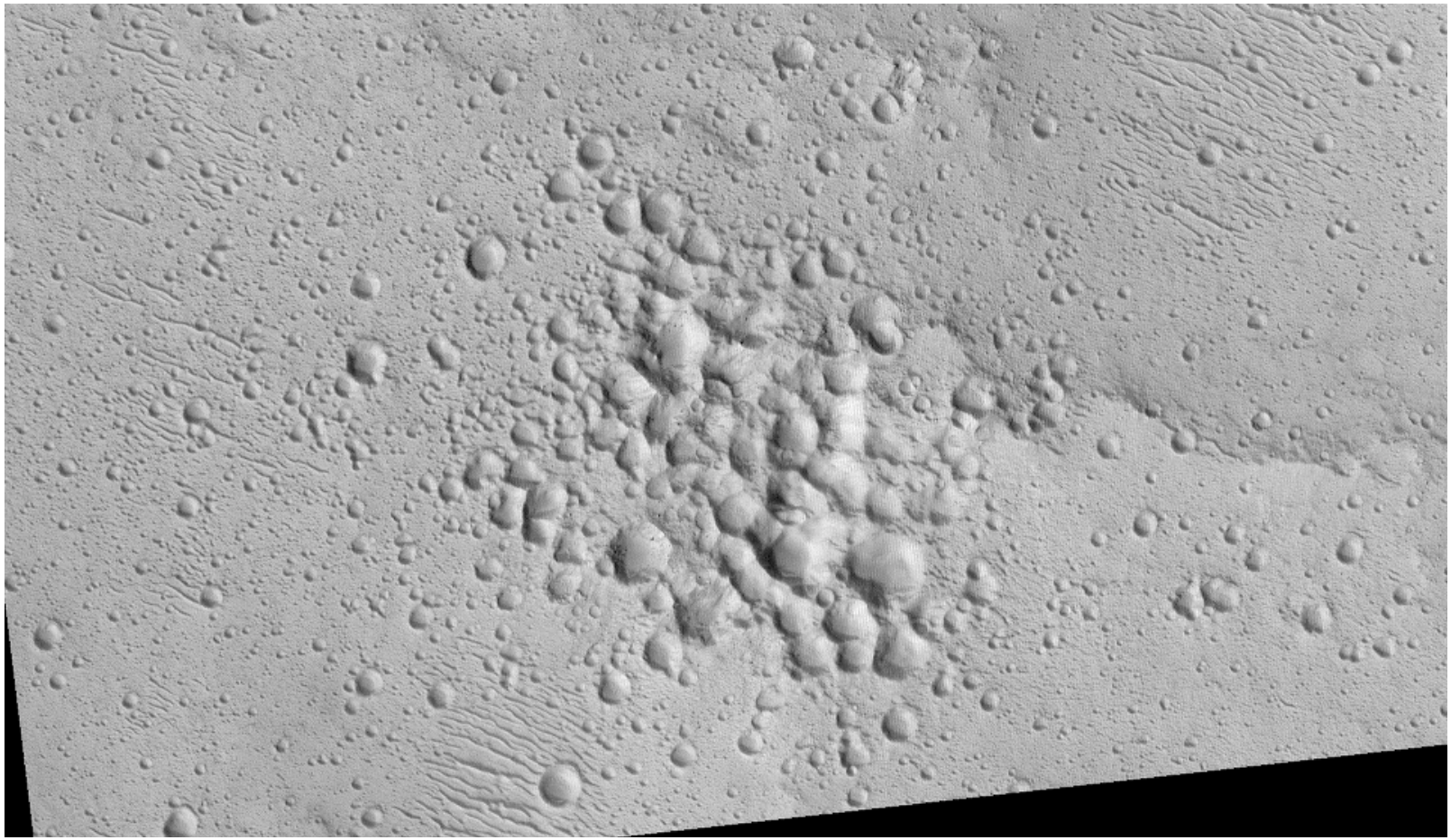


Layered / “fluidized” ejecta

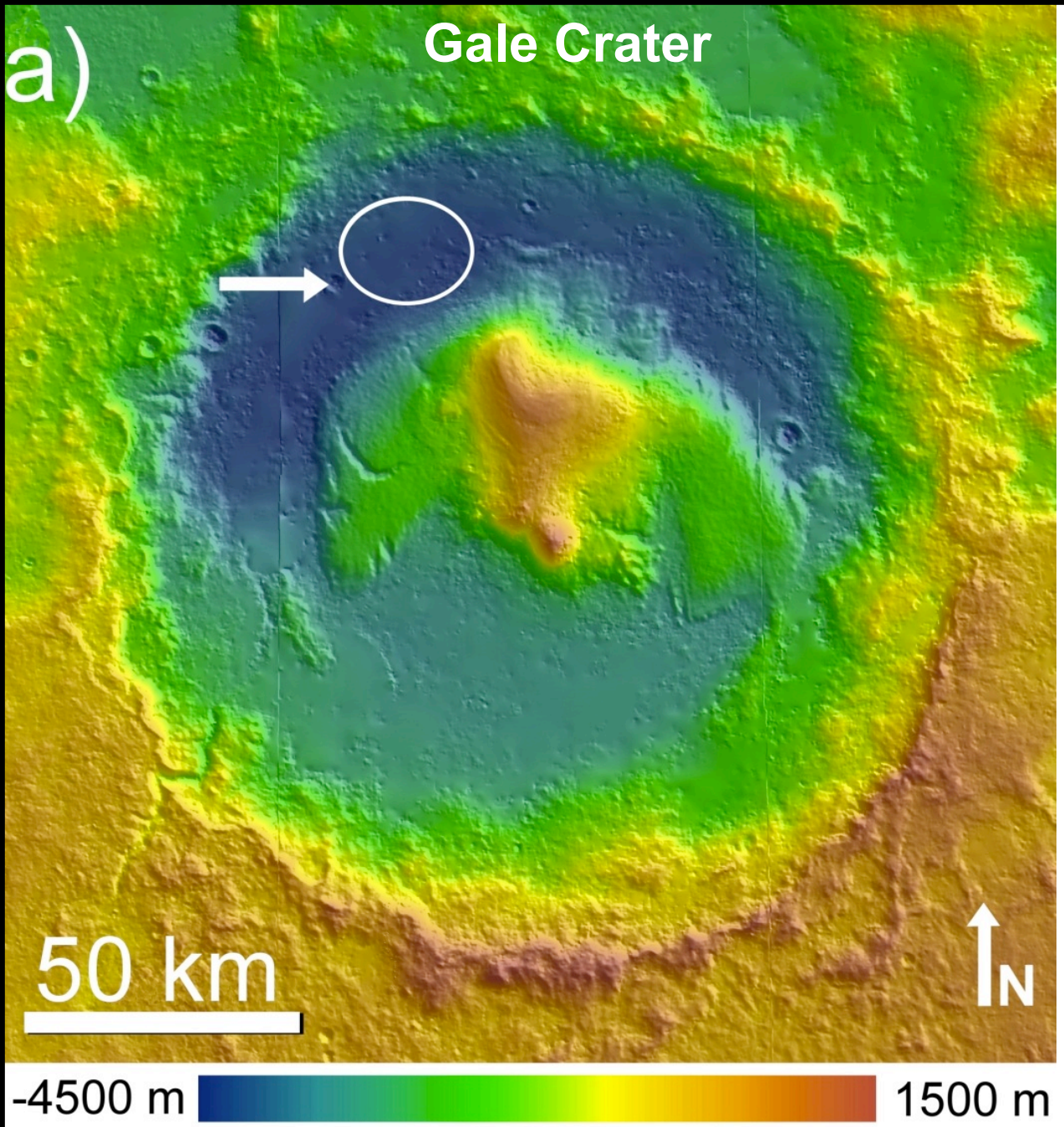


Barlow (2010)

Atmospheric effects



- Can slow down / break up meteoroids, producing crater clusters
- Significant when displaced mass $\sigma_\rho A/\sin\theta \approx$ meteoroid's mass
  ➔ Likelihood of breakup ~ $\sigma_\rho / R\rho\sin\theta$
- No craters smaller than ~3 km on Venus! (Few < 30 km)

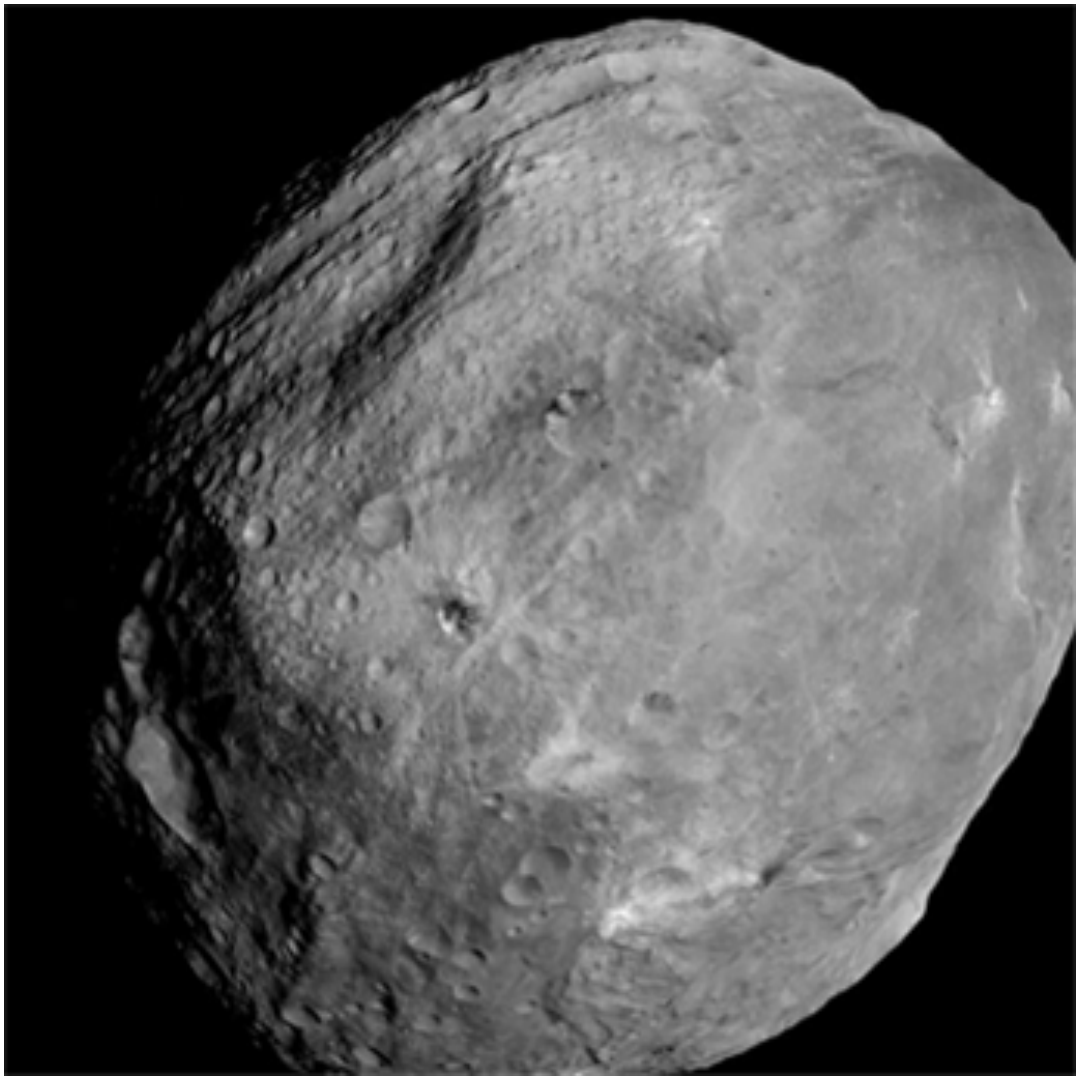


Central uplifts should be shorter than crater rims…

$h_{cp} \approx 0.1d$ **(Mars)**

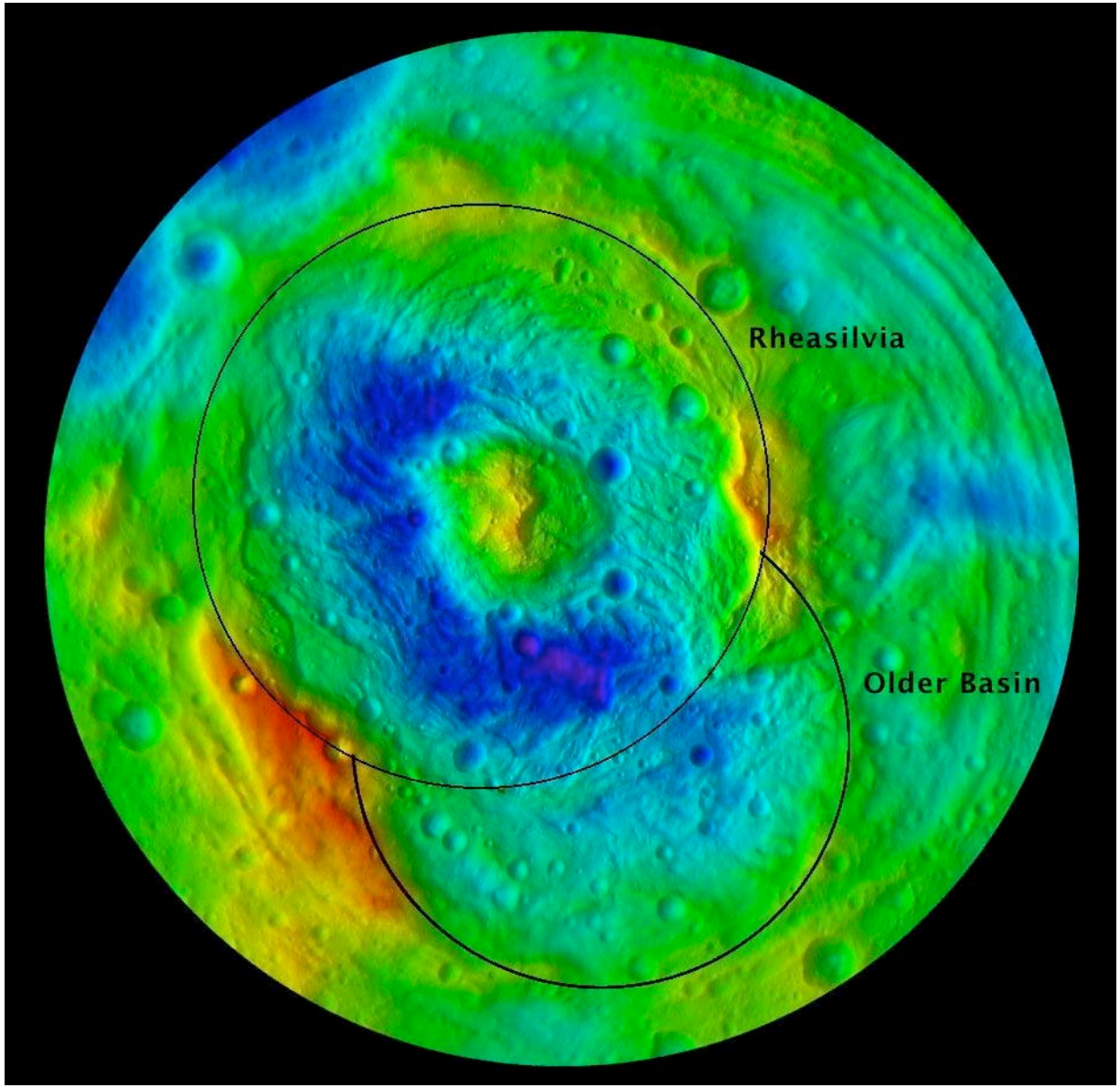
[Garvin et al., 2003]

Vesta

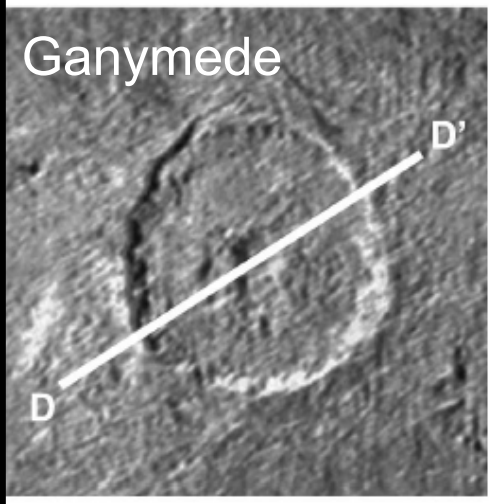


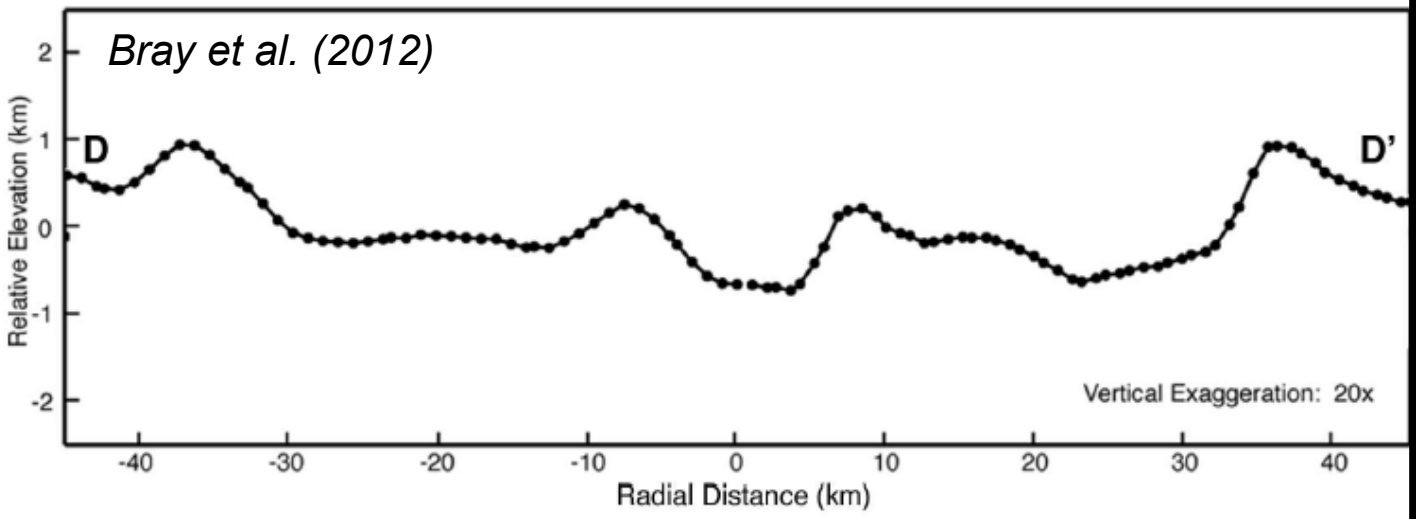
July 24, 2011

For $D \sim R_p$, normal rules do not apply…



Central pit craters



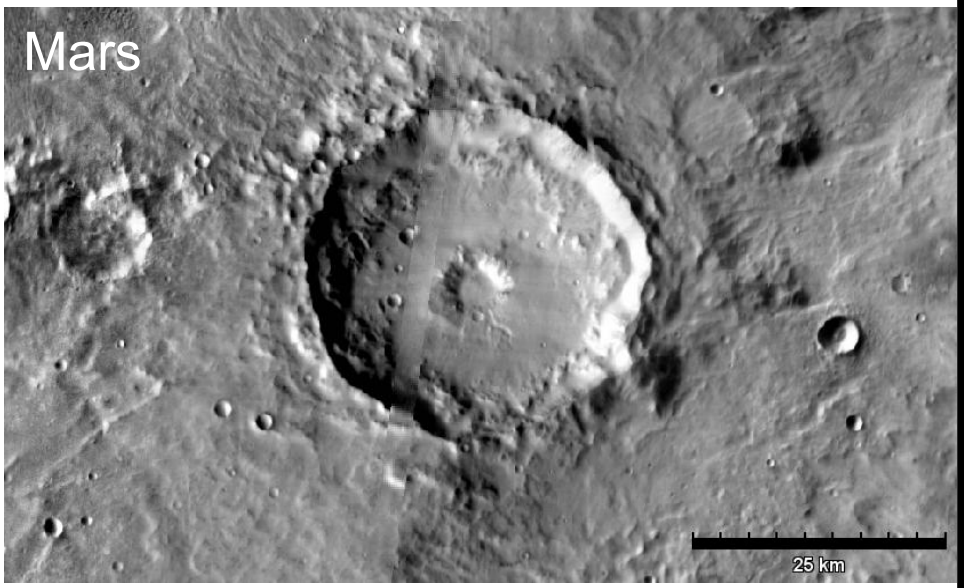


Form on Mars, icy moons via:

1) target volatile vaporization?

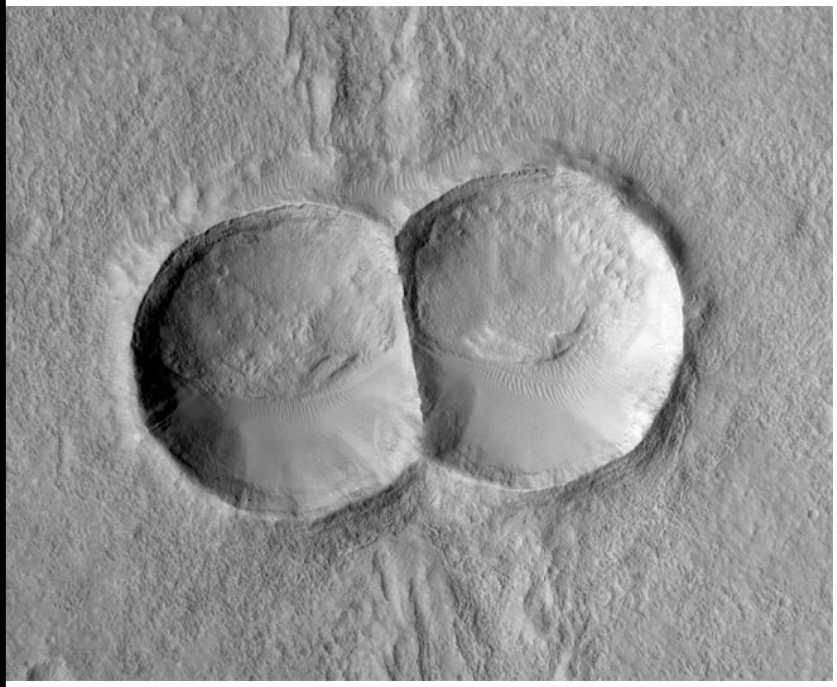
2) collapse of weak icy crust?

3) excavation into liquid?

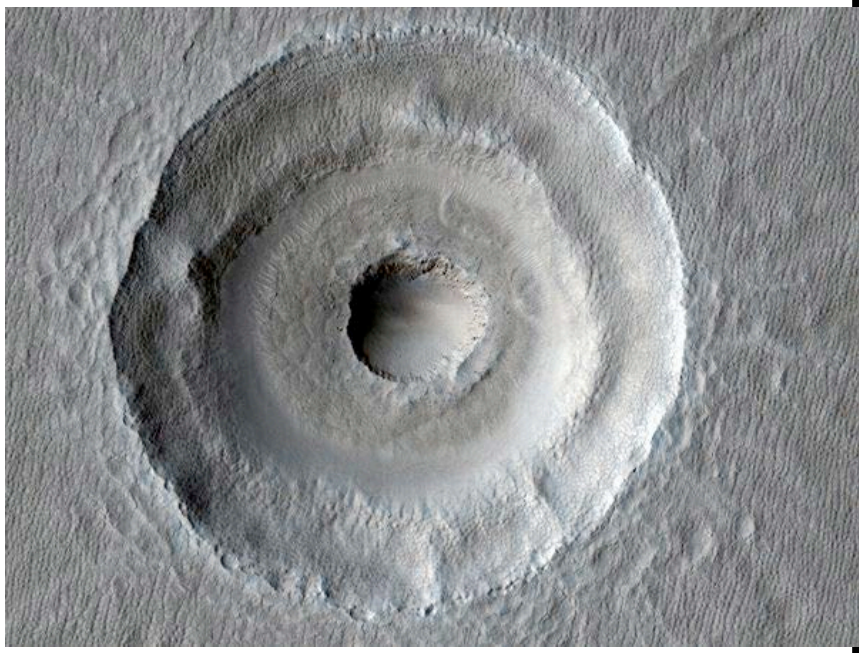


Other oddities

Very oblique impact? (<5°)



Binary asteroid?



Subsurface structure?