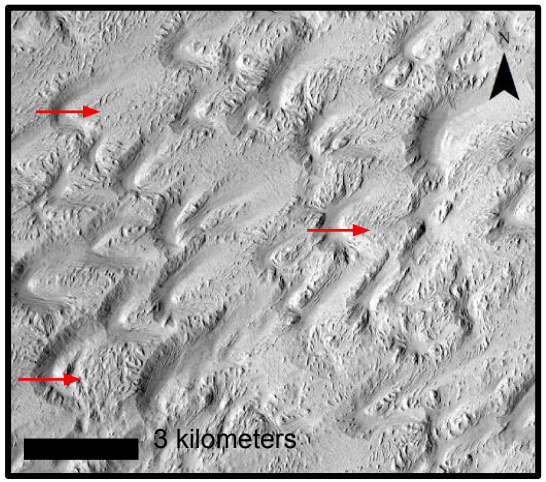
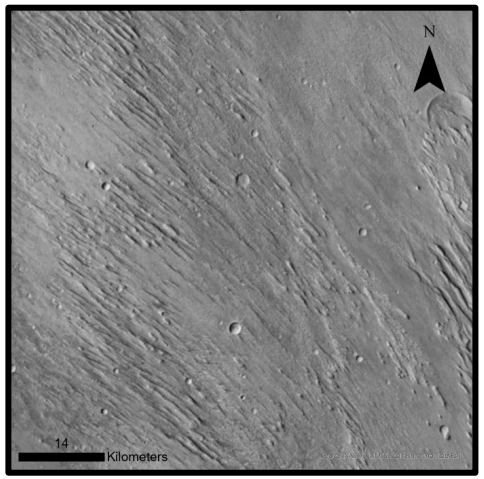
The Medusae Fossae Formation is an enigmatic terrain on the equator of Mars

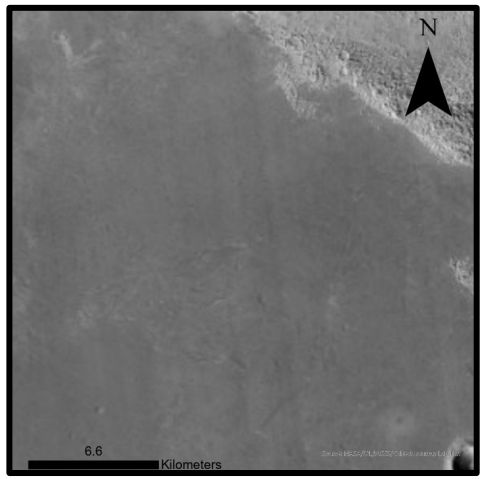
- 5000 km long discontinuous terrain on Mars' equator
- Several theories on formation and composition: volcanic vs icy
- Contains several small scale features such as scour pits
  - Small, aeolian features caused by wind eroding more friable material around a more resistant unit
- Goal to map surface textures and characterize roughness in order to constrain composition



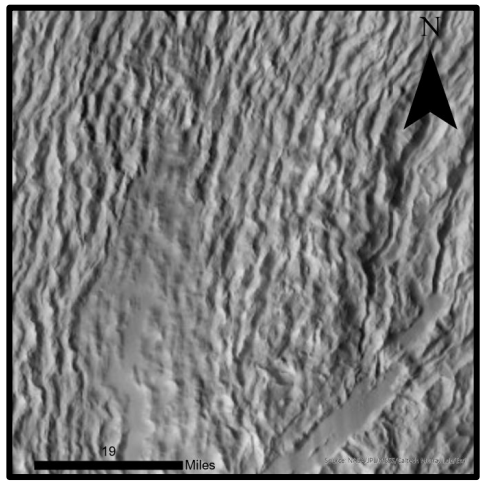
Barchan scour pits to the southwest of Olympus Mons.
Image Source: CTX



Yardangs in the western MFF.
Image Source: CTX



Smooth texture in the western MFF.
Image Source: CTX



Olympus Mons landslide texture
Image Source: CTX

We used data from NASA's Mars Reconnaissance Orbiter (MRO) spacecraft

- Context Camera (CTX)
  - 6 m/pixel images
  - Used for GIS basemap
  - Mapped surface textures qualitatively

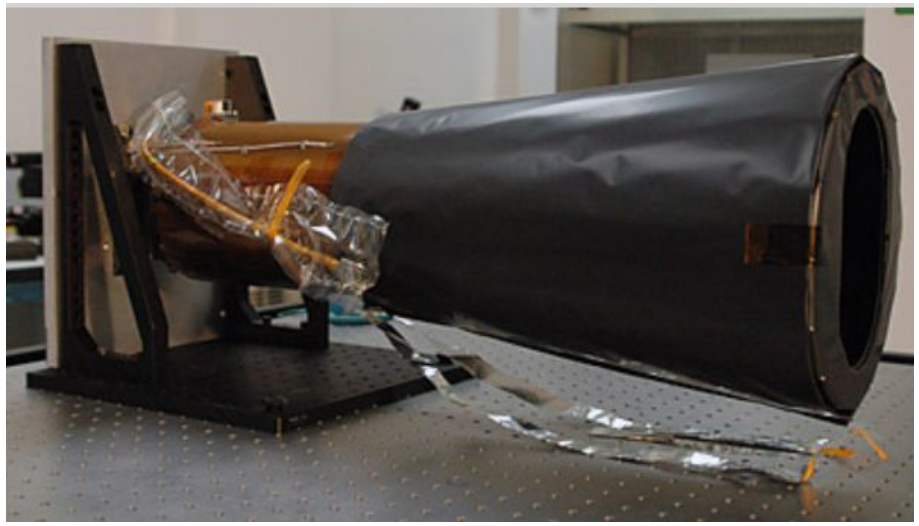


Image source: Malin Space Sciences Systems

- Shallow Radar (SHARAD)
  - Quantitatively characterized surface roughness by how much radar power is returned by the surface and shallow subsurface

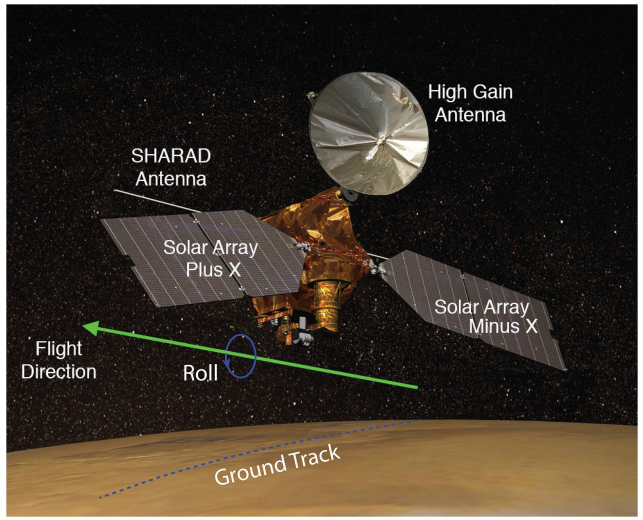
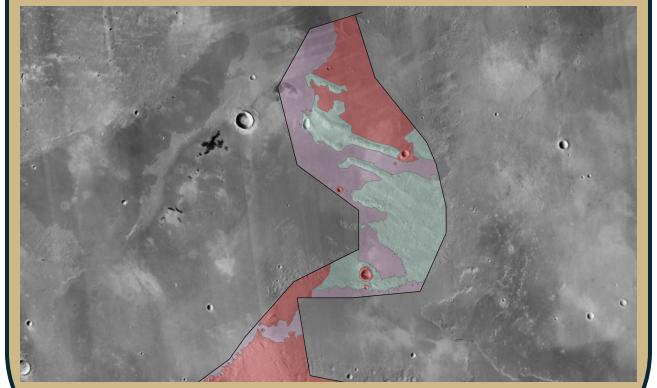


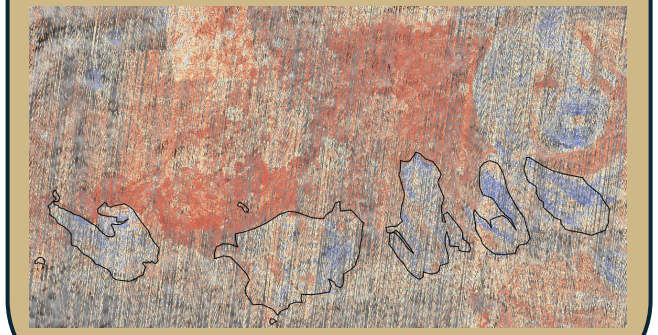
Image source: NASA

We quantified the surface textures in ArcGIS

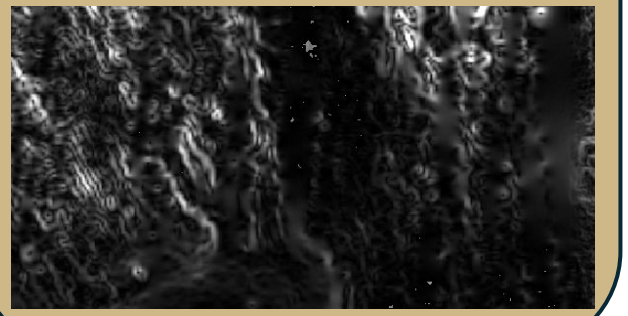
Polygon mapping of surface textures



Extract radar roughness



Create Terrain Ruggedness Index (TRI) from DEM



Extract TRI from polygons

Analyze results for surface textures

We see quantitative differences based on surface texture mapping

- Smooth textures appear to be low roughness in both the radar and DEM based metrics
- Olympus texture is roughest in the DEM metric, but exhibits similar values to other terrains in radar wavelengths due to differences in scale or shallow subsurface properties
- Continued analysis will inform us more about the geologic