# Science Issues

- What is the bench material?
- What underlies the bench material and at what depth.
  - Ancient cratered terrain clearly underlies the bench at some depth, but
  - Do  northern plains materials immediately underlie part of the bench material at a depth of a few hundred meters or less?

# What is the bench material? (1)

- Interbedded volcanic flows and pyroclastics
  - Pro
    - Parts of bench look like ridged plains
    - Pancake like structures
  - Con
    - No visible flows
    - No major volcanic sources
    - Etched northern boundary incompatible with volcanic flows

# What is the bench material? (2)

- Sediments deposited in a northern ocean
  - Pro
    - Lies between the Arabia shoreline and other shorelines mapped by Parker and co-workers.
    - Bench materials are layered, appear to lap onto adjacent uplands and bound to north by outward facing escarpment as expected if marine sediments derived from adjacent highlands
  - Con
    - Evidence for shorelines ambiguous

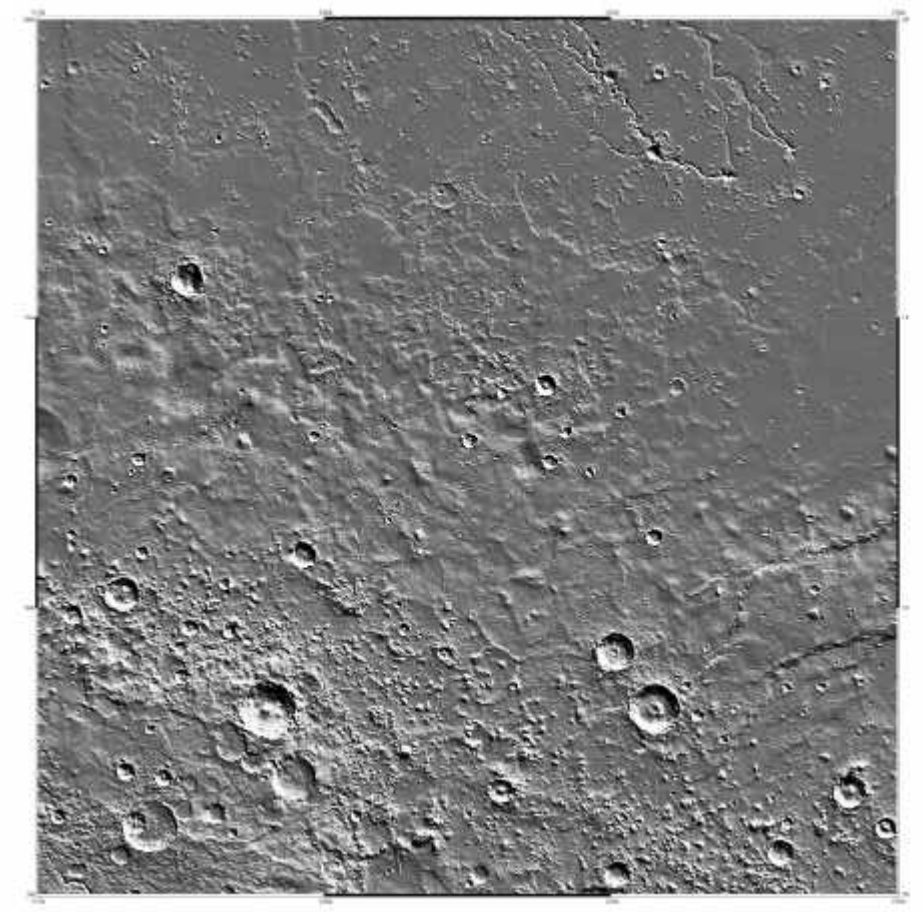
# What is the bench material?(3)

- Alluvium/colluvium derived from the adjacent highlands
  - Pro
    - Situated close to steep highland front
  - Con
    - No evidence of fluvial activity
    - Very low slopes on the bench – difficult to transport material across the bench by mass wasting processes (eg solifluction)

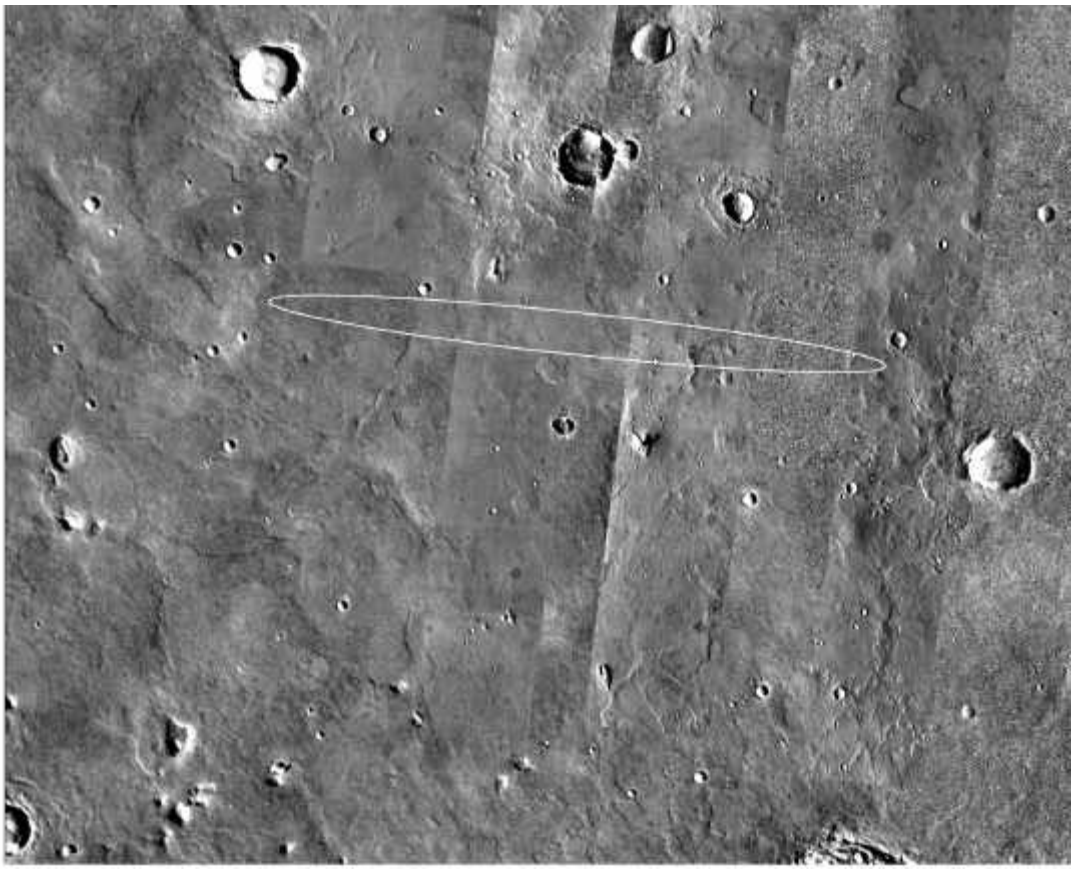
# What is the bench material? (4)

- Wind deposit analogous to the Medusae Fossae Fm.
  - Pro
    - Little to support this explanation other than lack of any other satisfactory explanation
    - Con.
      - Little evidence of wind action other than the etched northern margin
      - Lacks the abundant yardangs of the MFF

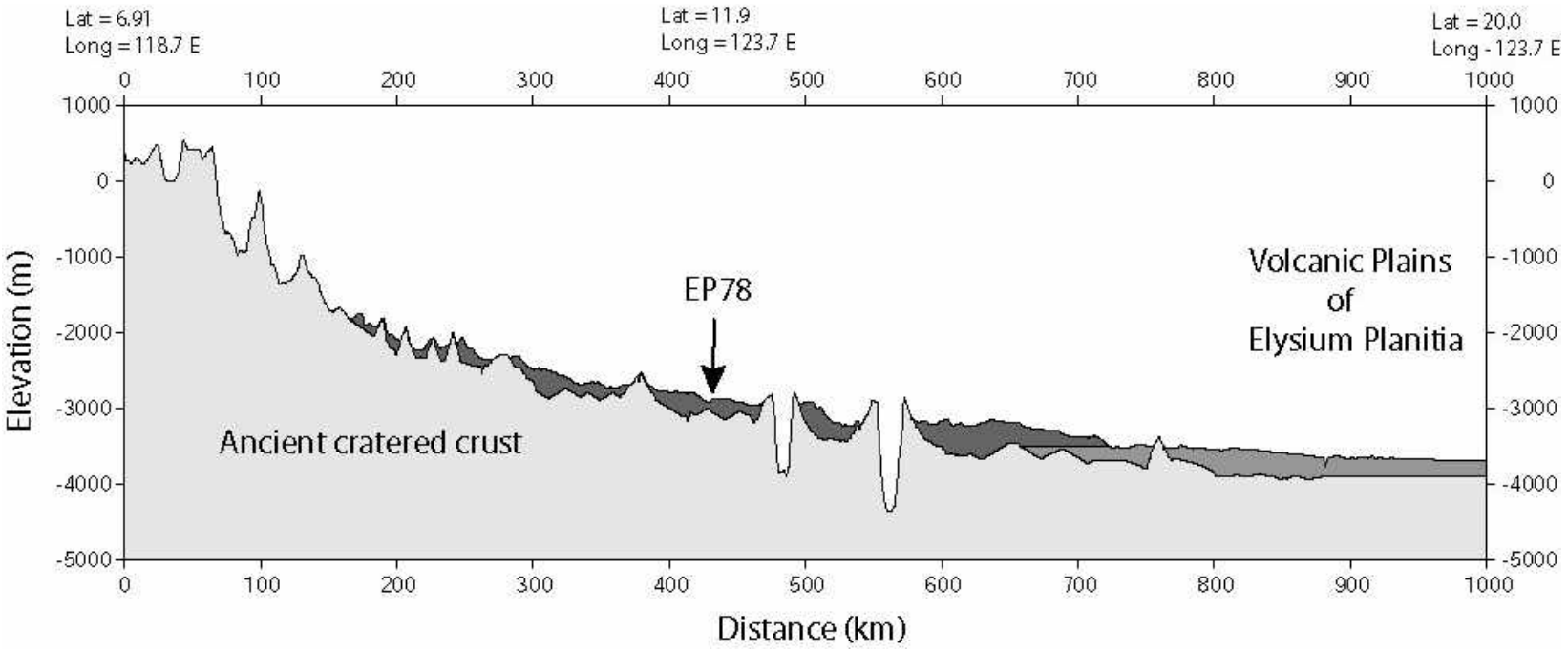
# Elysium – MOLA synoptic view



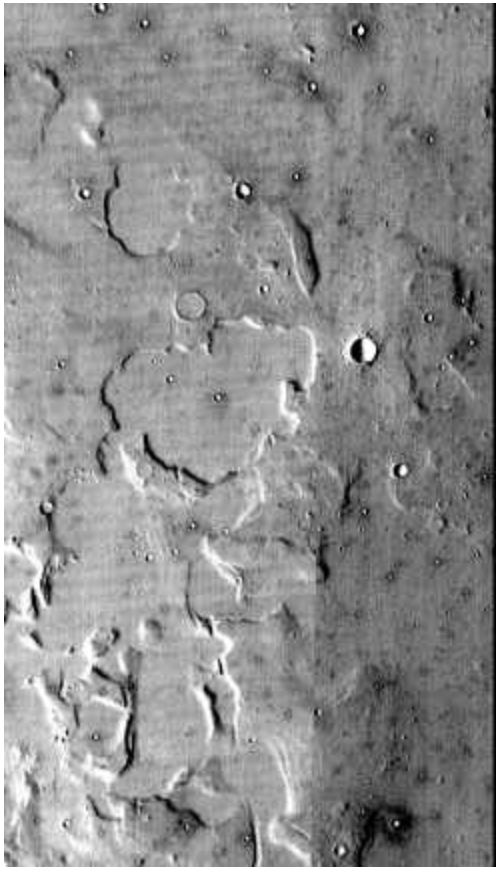
# Elysium – MDIM/THEMIS



# Elysium cross-section



# Elysium bench – etched north margin



# MOC – etched margin

# MOCs in the ellipse