Inferno Chasm Rift Zone, Idaho

A terrestrial analog for plains-style volcanism in southeastern Mare Serenitatis on the Moon?

Exploration Science Forum
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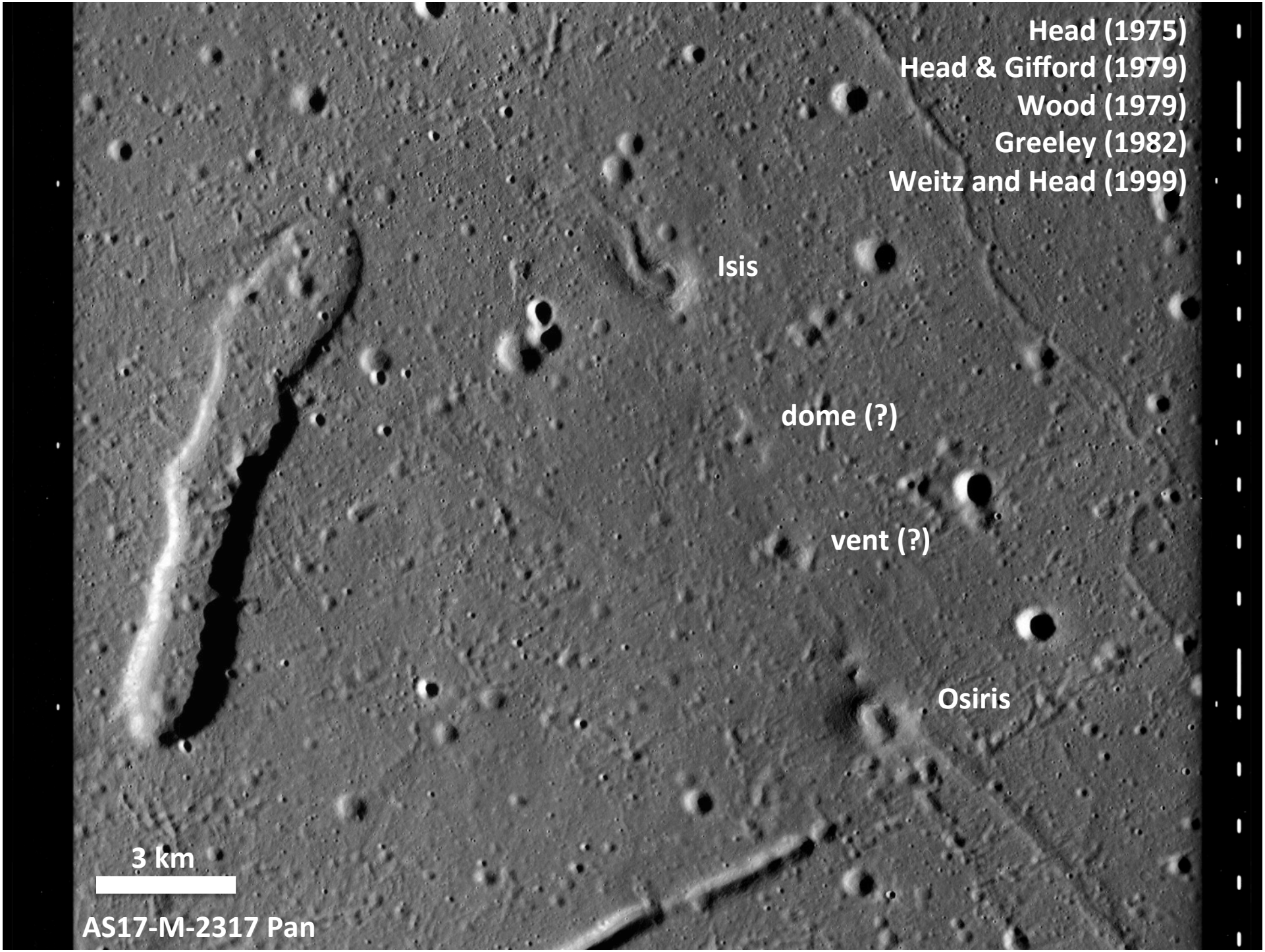
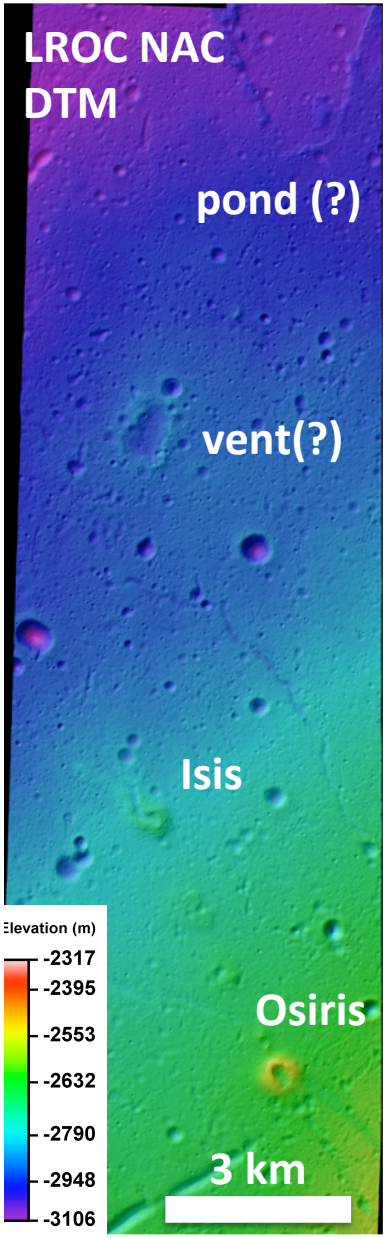
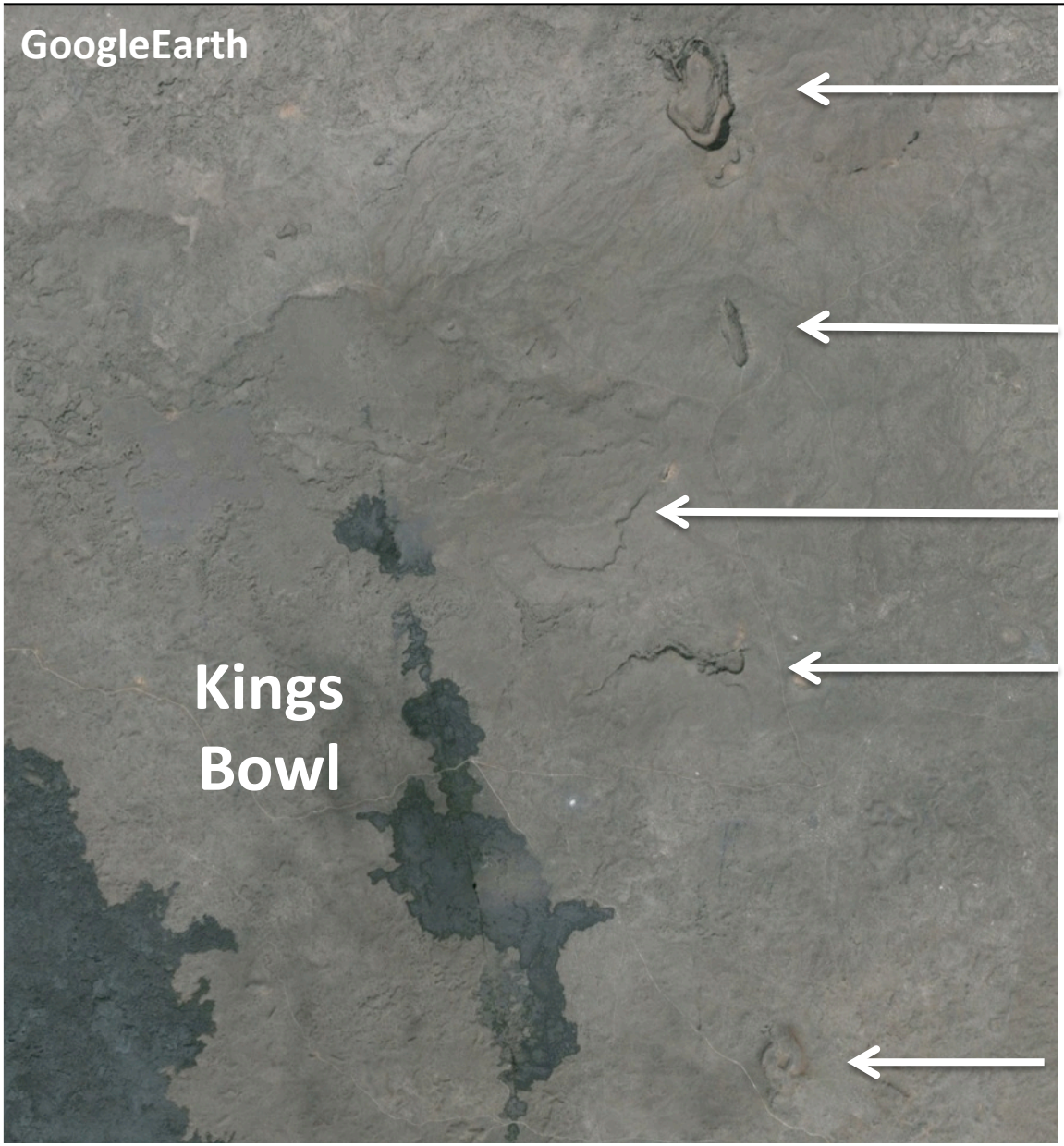
SSERVI FINESSE Team


Head (1975)
Head & Gifford (1979)
Wood (1979)
Greeley (1982)
Weitz and Head (1999)
Isis
dome (?)
vent (?)
Osiris
3 km
AS17-M-2317 Pan

Comparing Earth to the Moon





Wild Horse Corral

Cottrell's
Blowout

Papadakis
perched pond

Inferno Chasm

Grand View crater

Questions

Do lunar volcanic features around Isis and Osiris represent plains-style volcanism?

How can features along Inferno Chasm Rift (Idaho) inform eruption conditions for lunar features?

AS17-M-2317 Pan

Overview

Plains-style Volcanism

Lunar Plains-style volcanism

Inferno Chasm Rift Zone

Comparative Planetology

Importance of Stratigraphy

Summary and Future Work

AS17-M-2317 Pan

Plains-style Volcanism

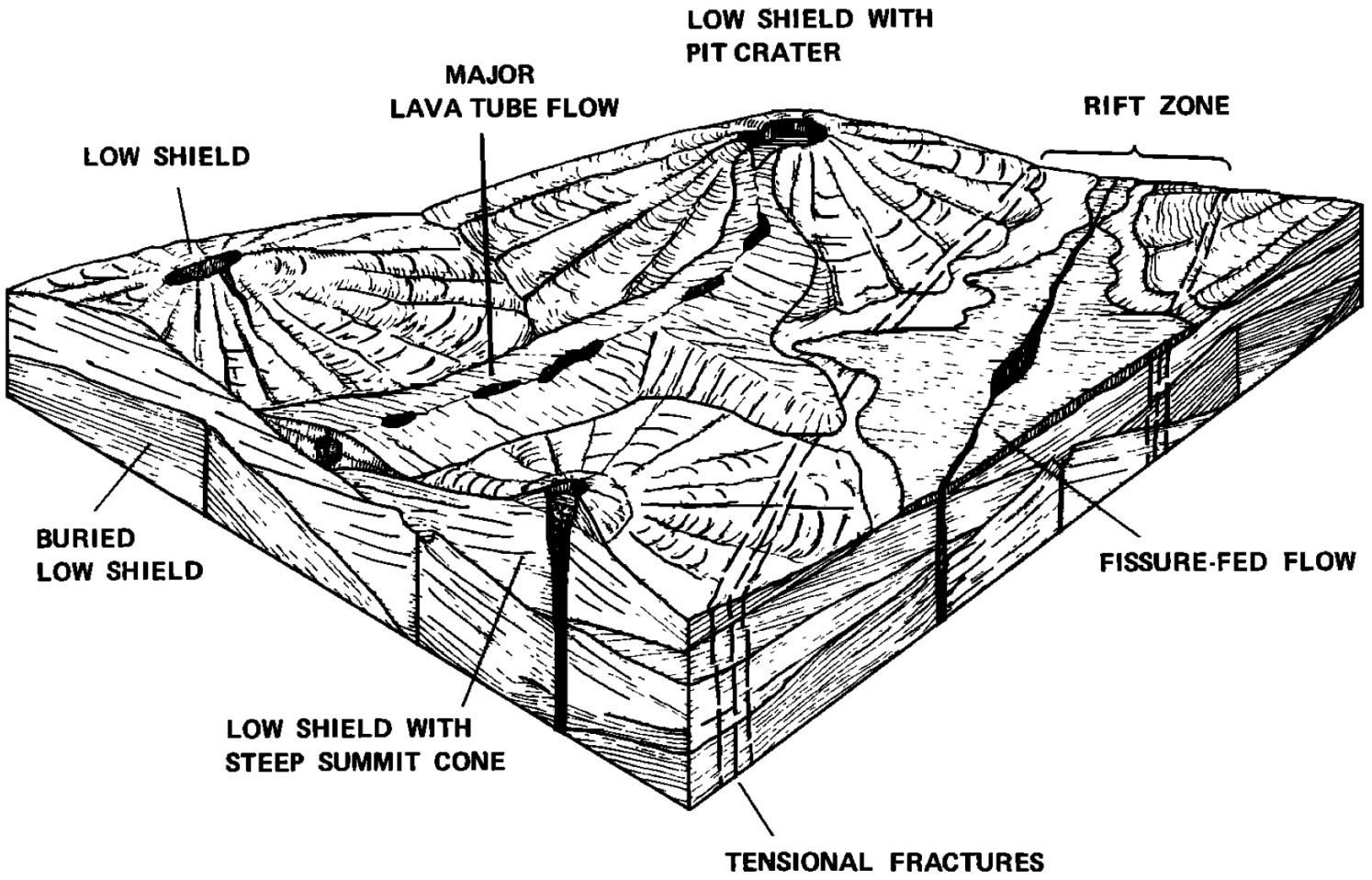
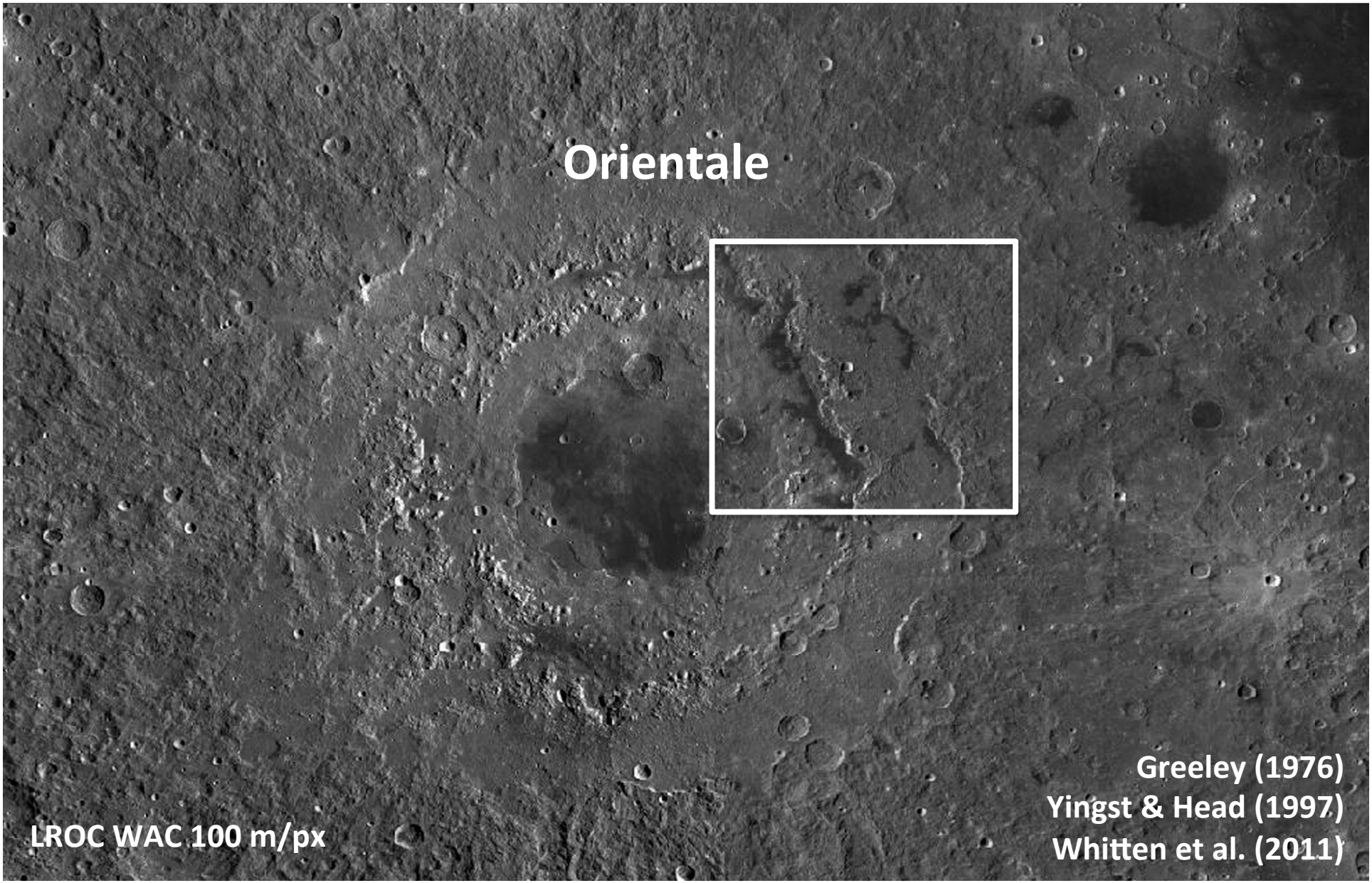


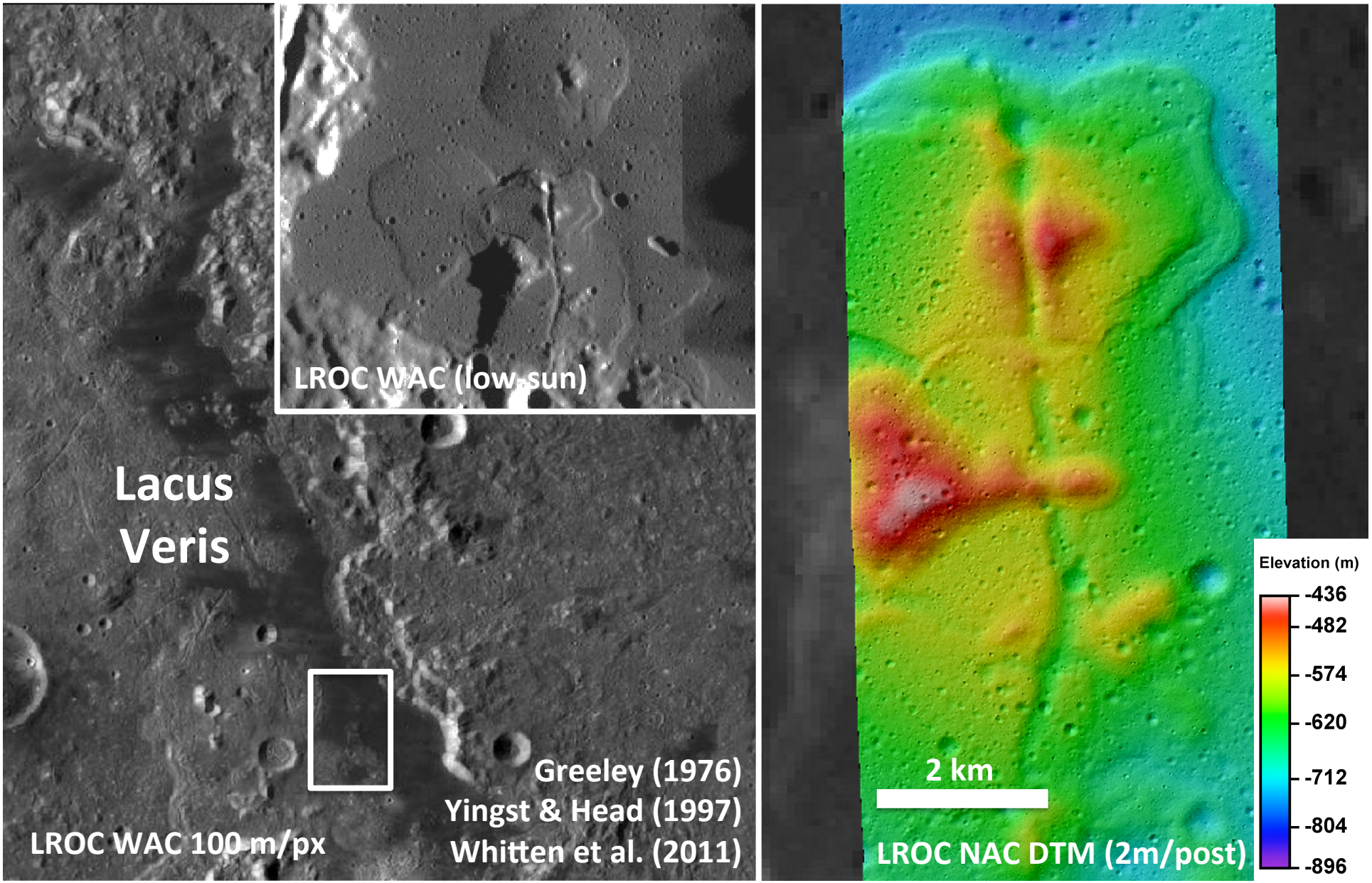
Fig. 4b. Block diagram showing the relationship of low shields, major lava tube flows, and fissure flows. Compare with Figure 7.

Greeley, 1982

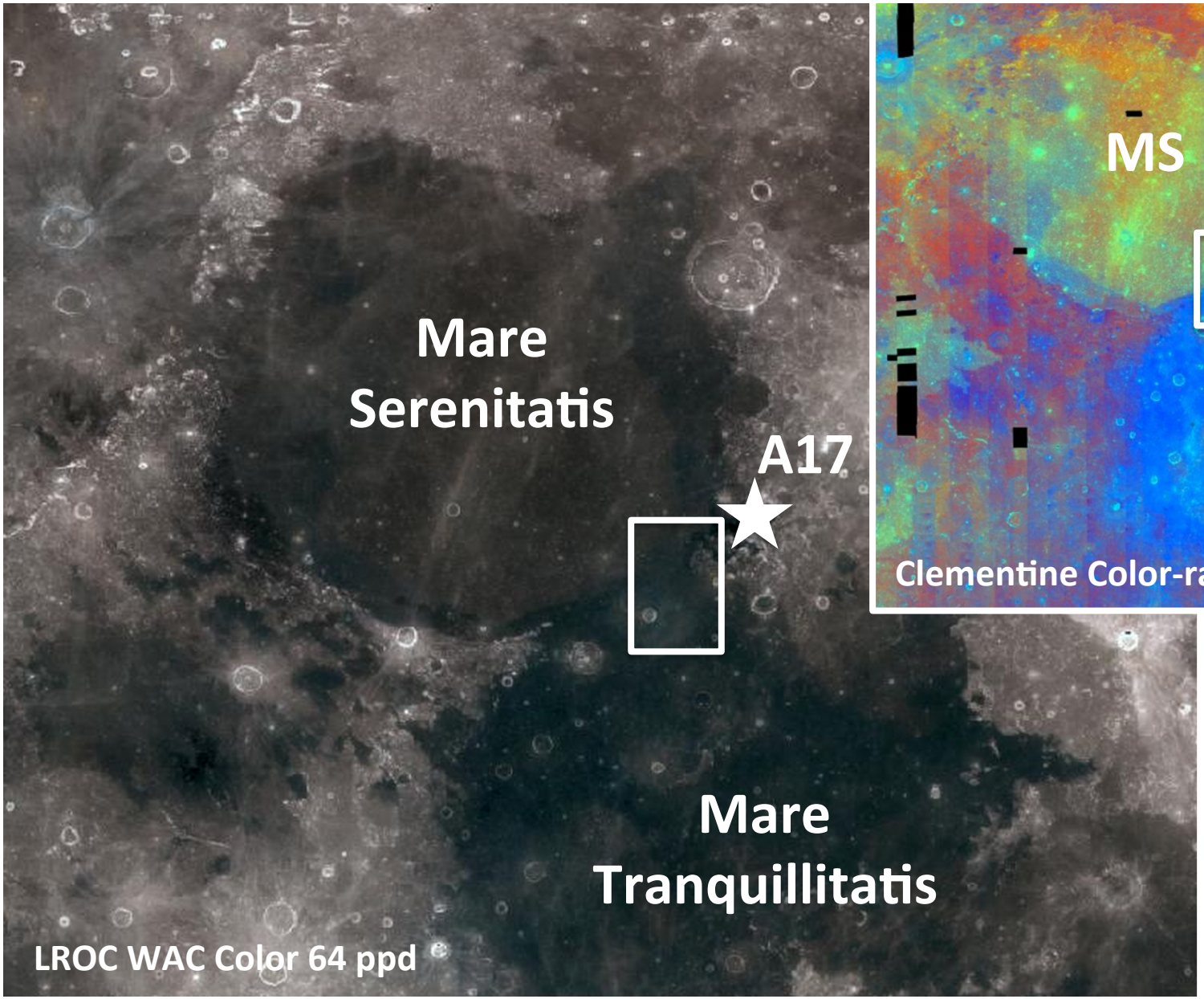
Plains Style on the Moon

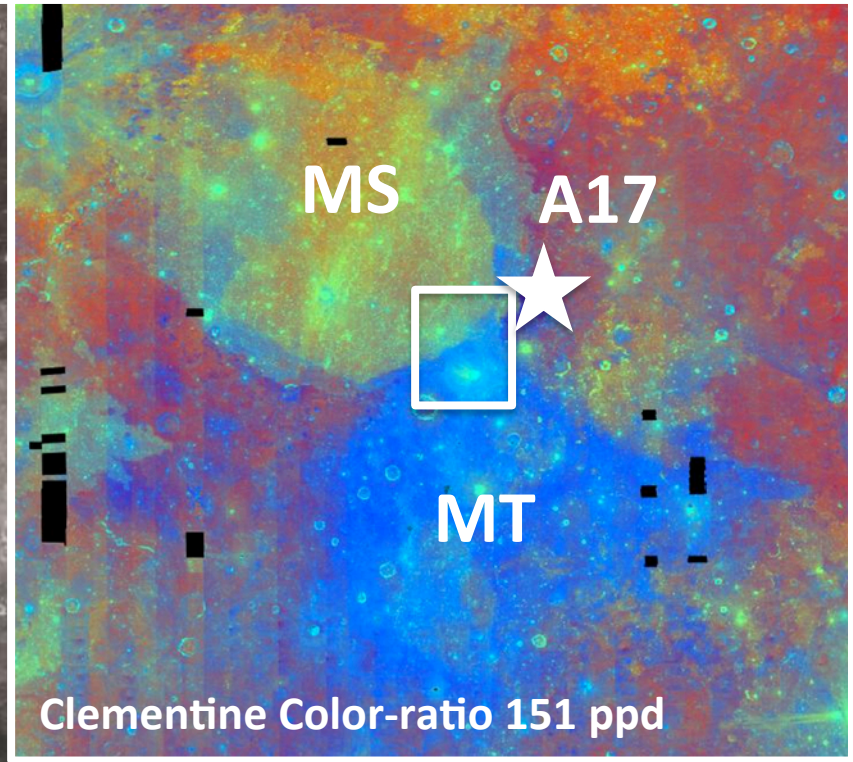


Plains Style on the Moon



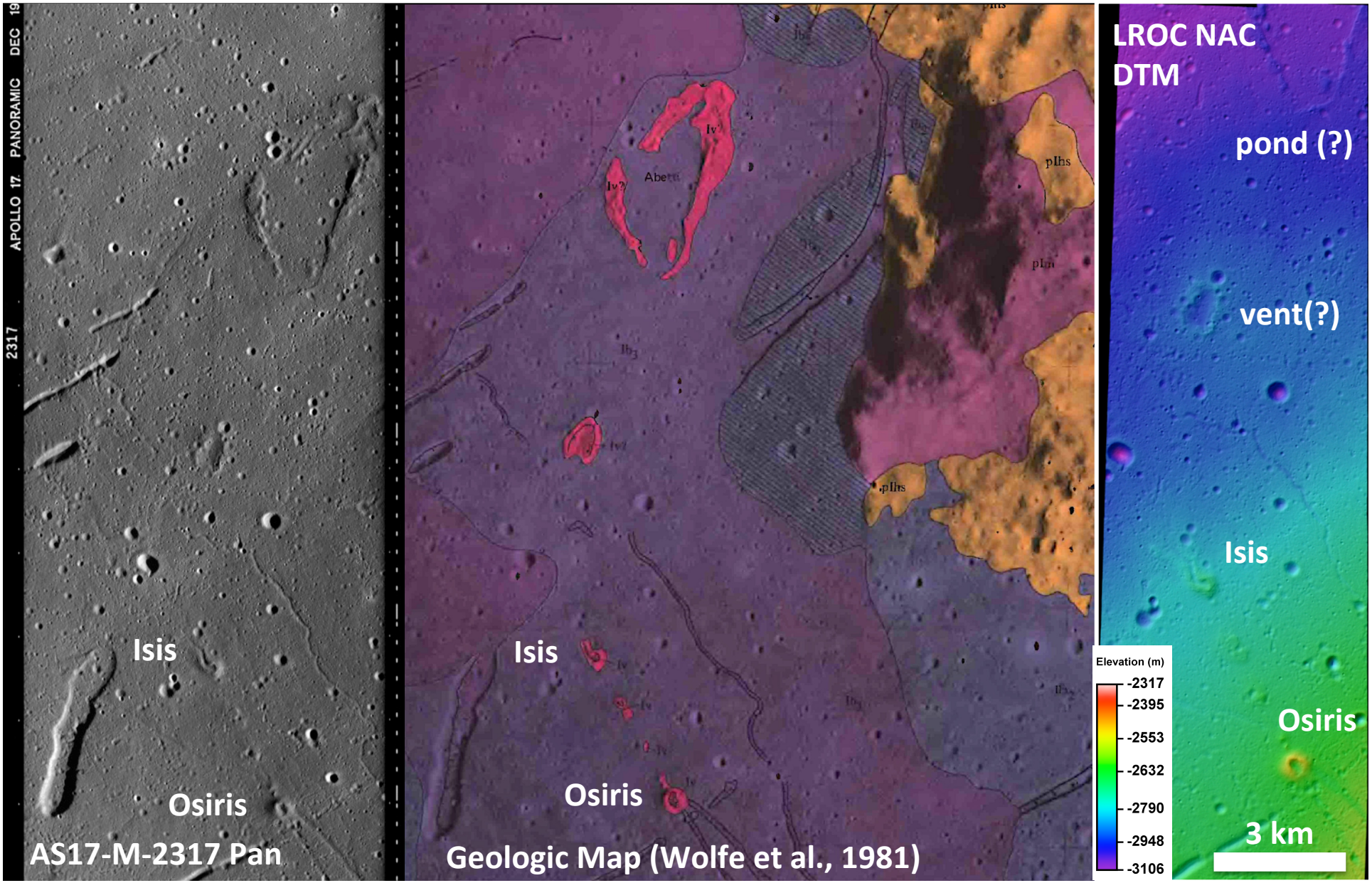
Southeastern Mare Serenitatis



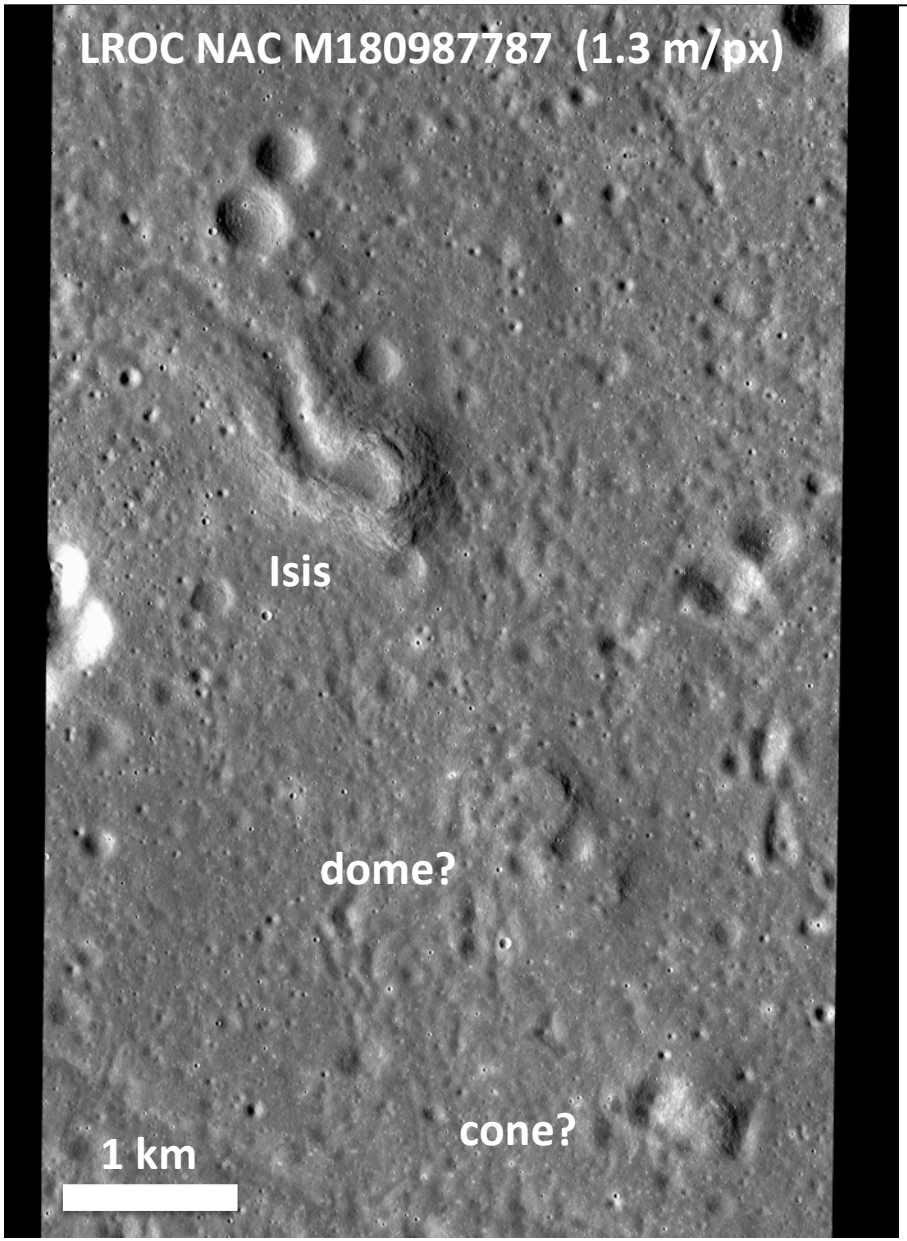


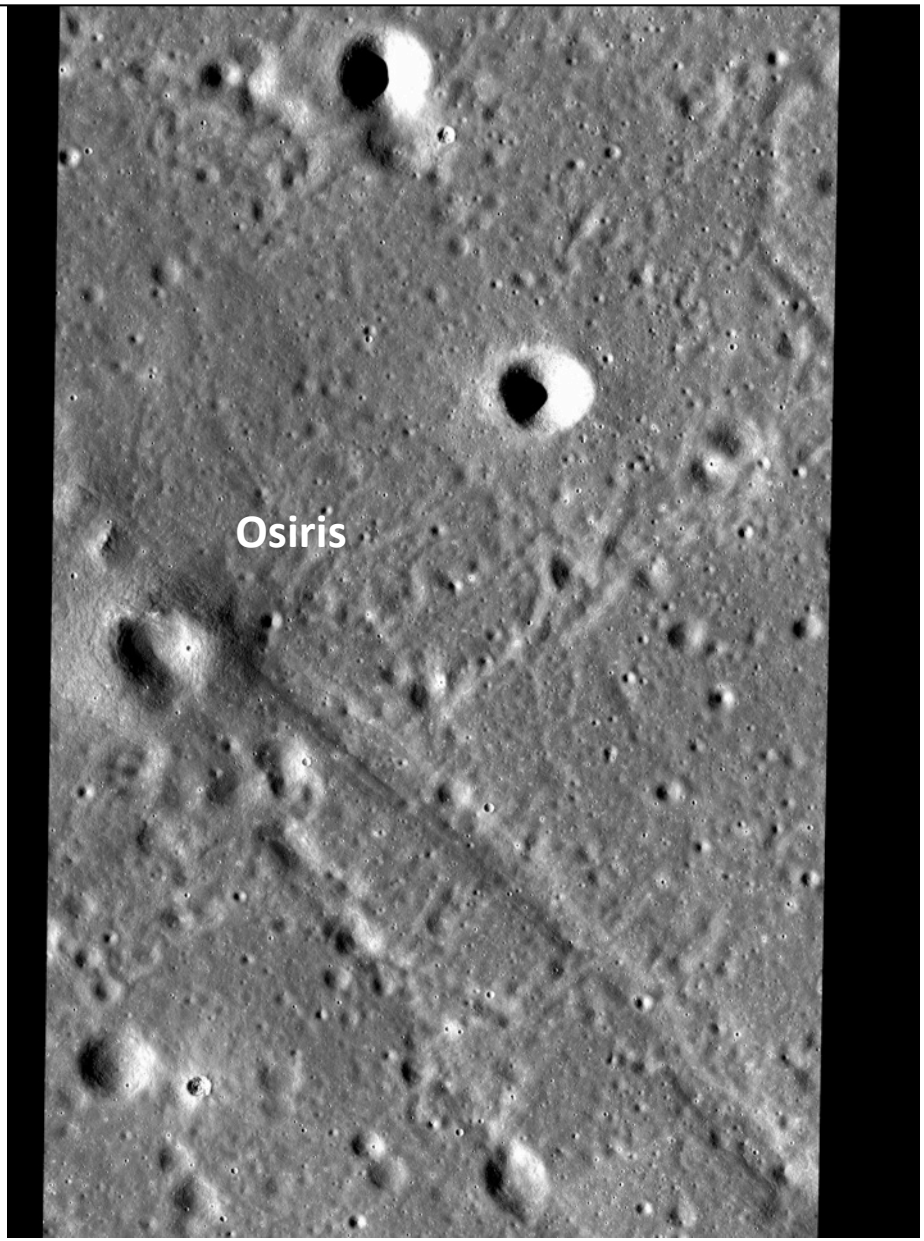
Head, 1975
Wood, 1979
Weitz & Head, 1999

Southeastern Mare Serenitatis

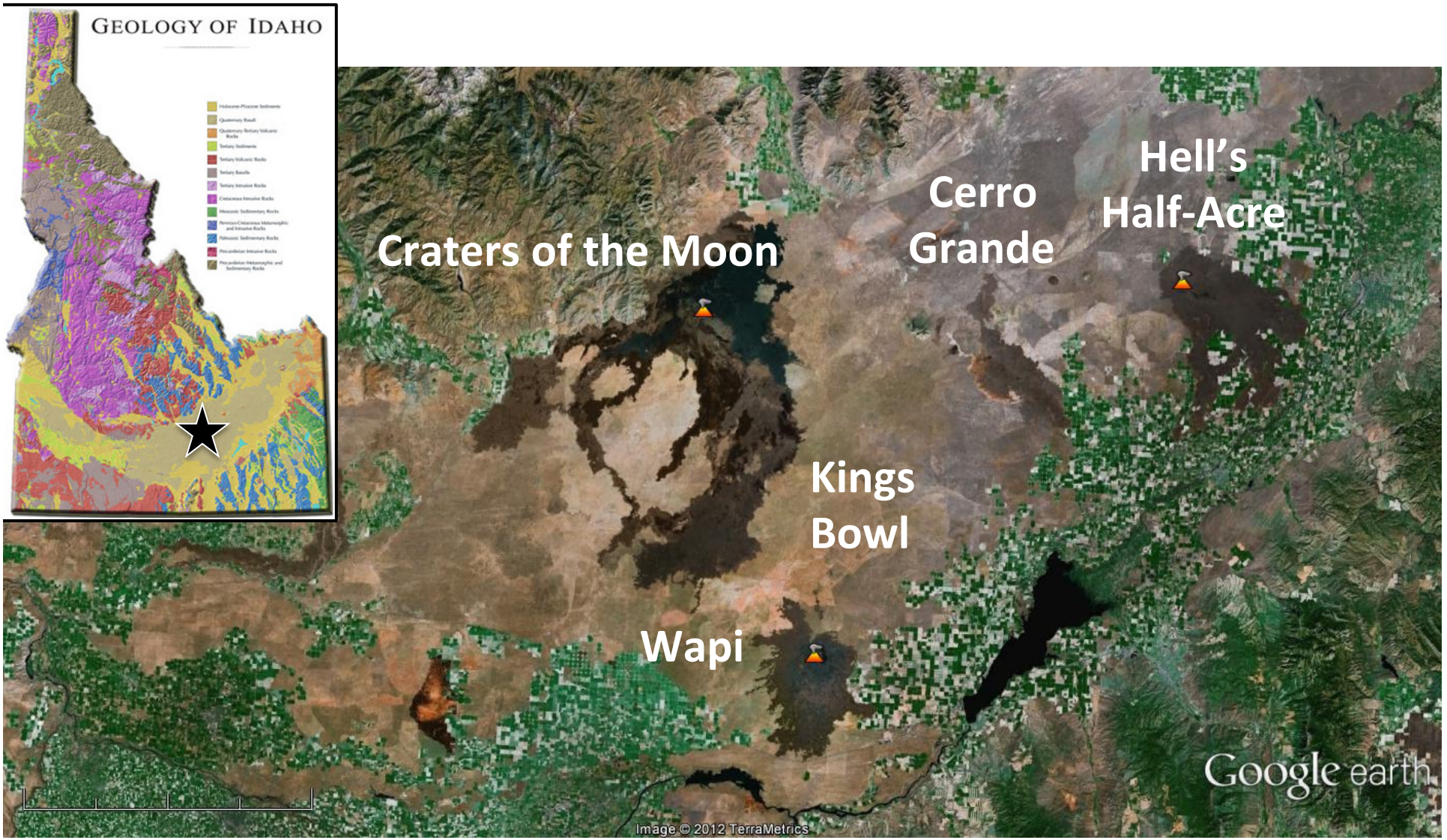


Southeastern Mare Serenitatis

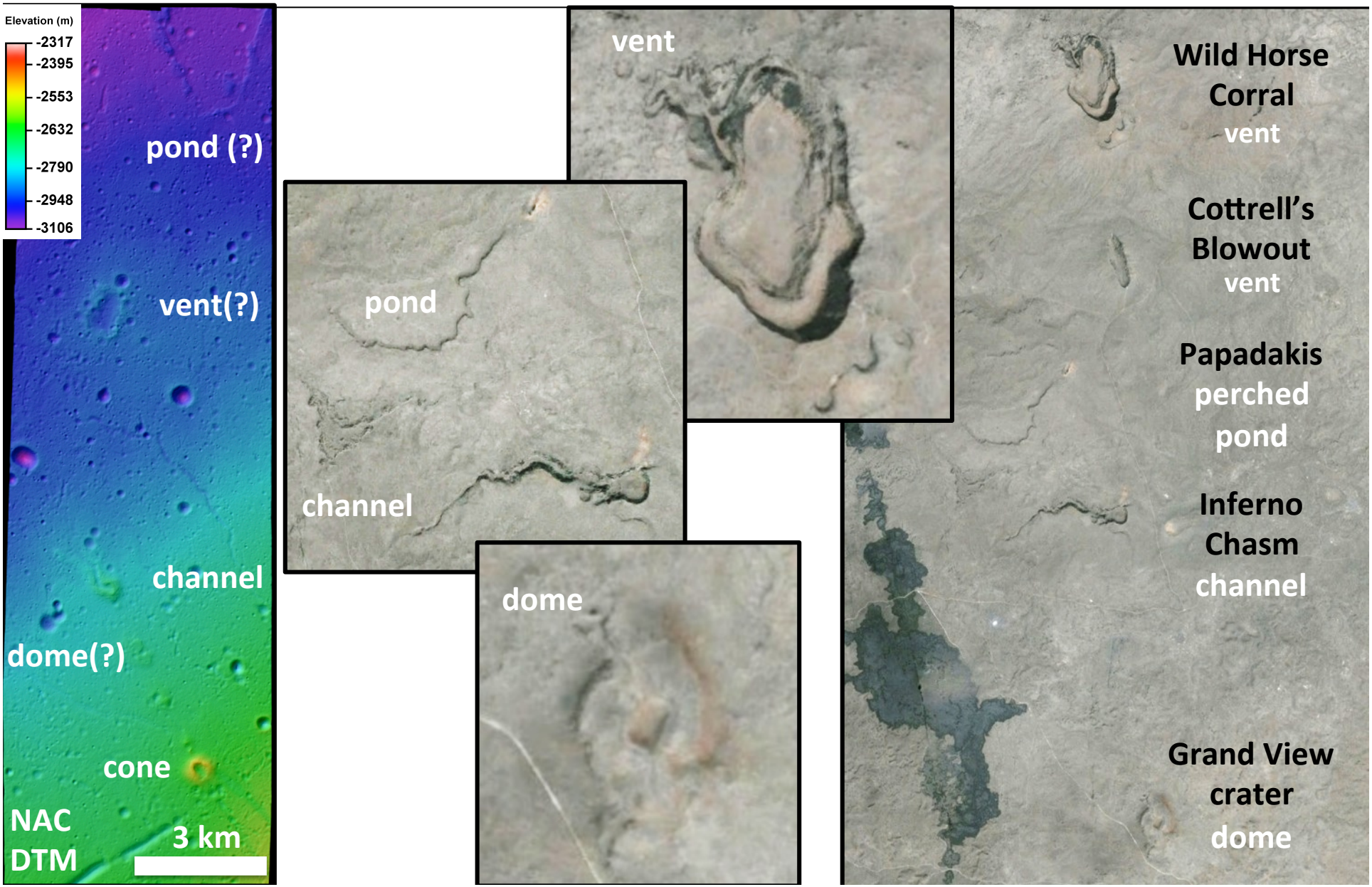




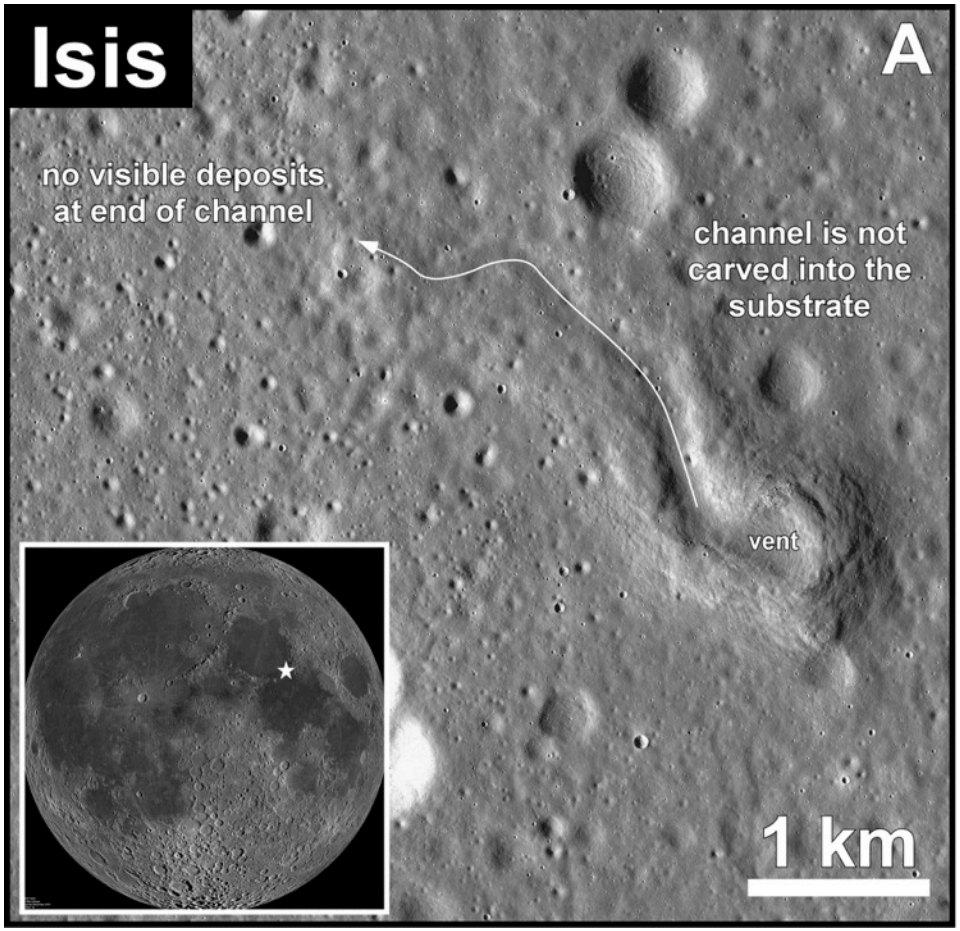
Geologic Context

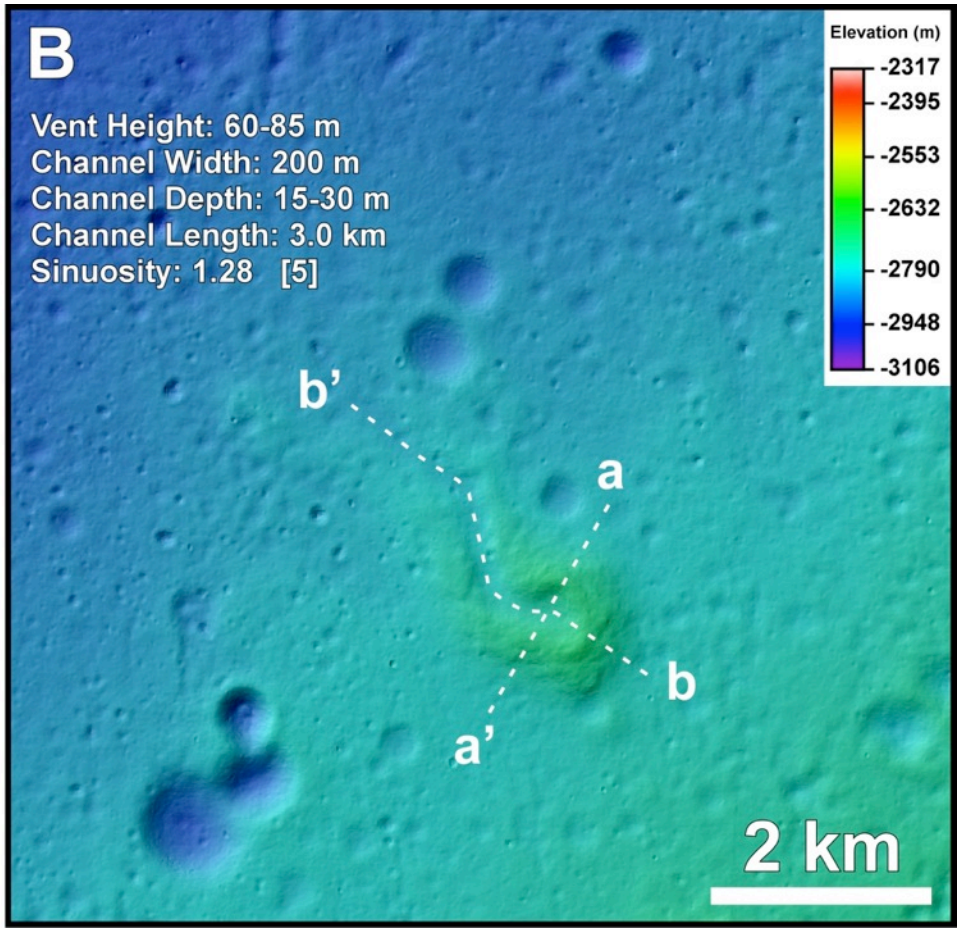


Comparing the Moon to Earth

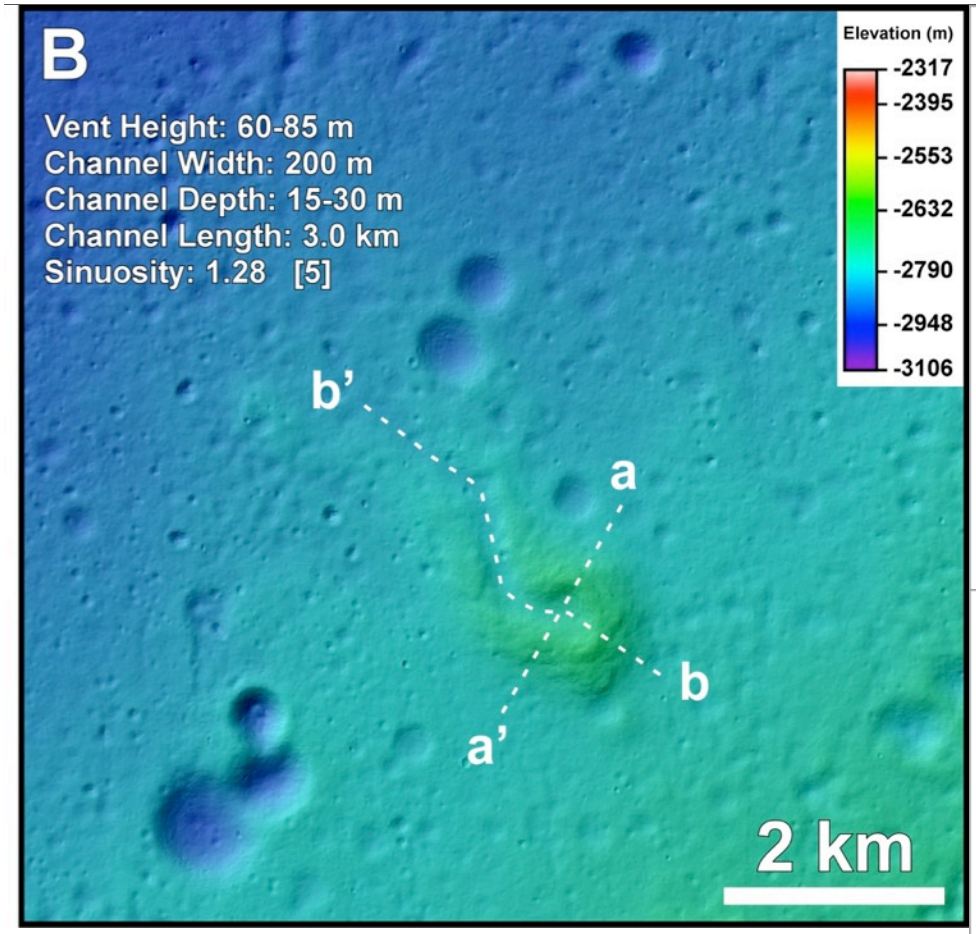


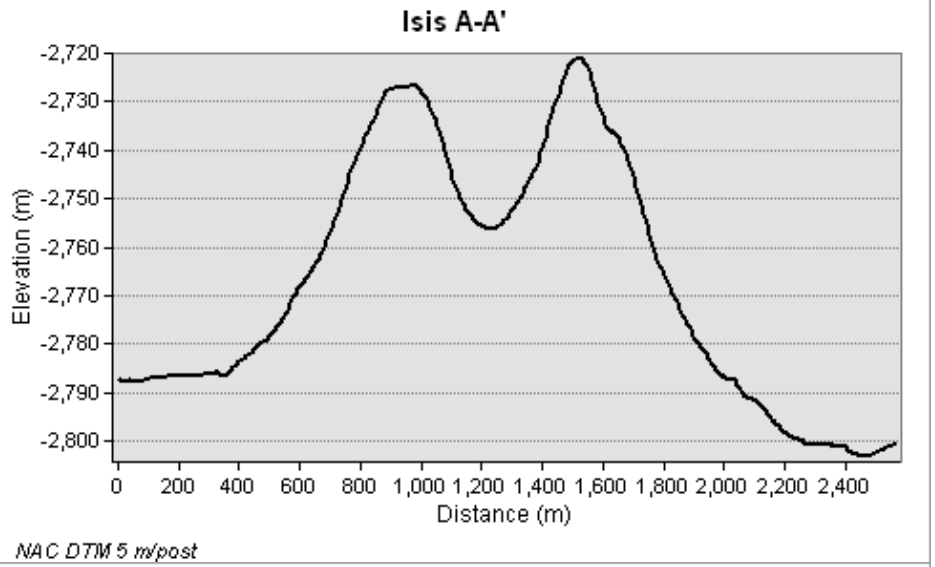
Lunar Rilles





Lunar Rilles





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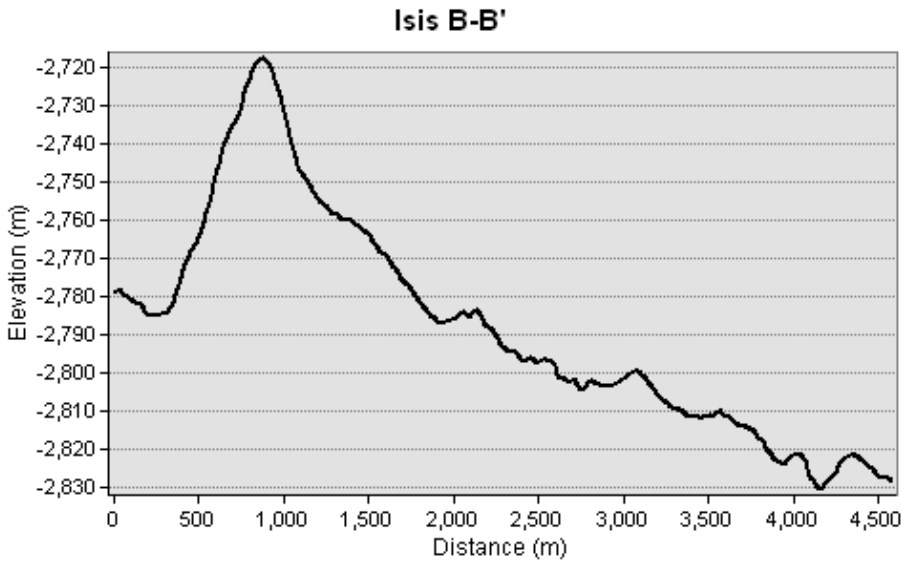

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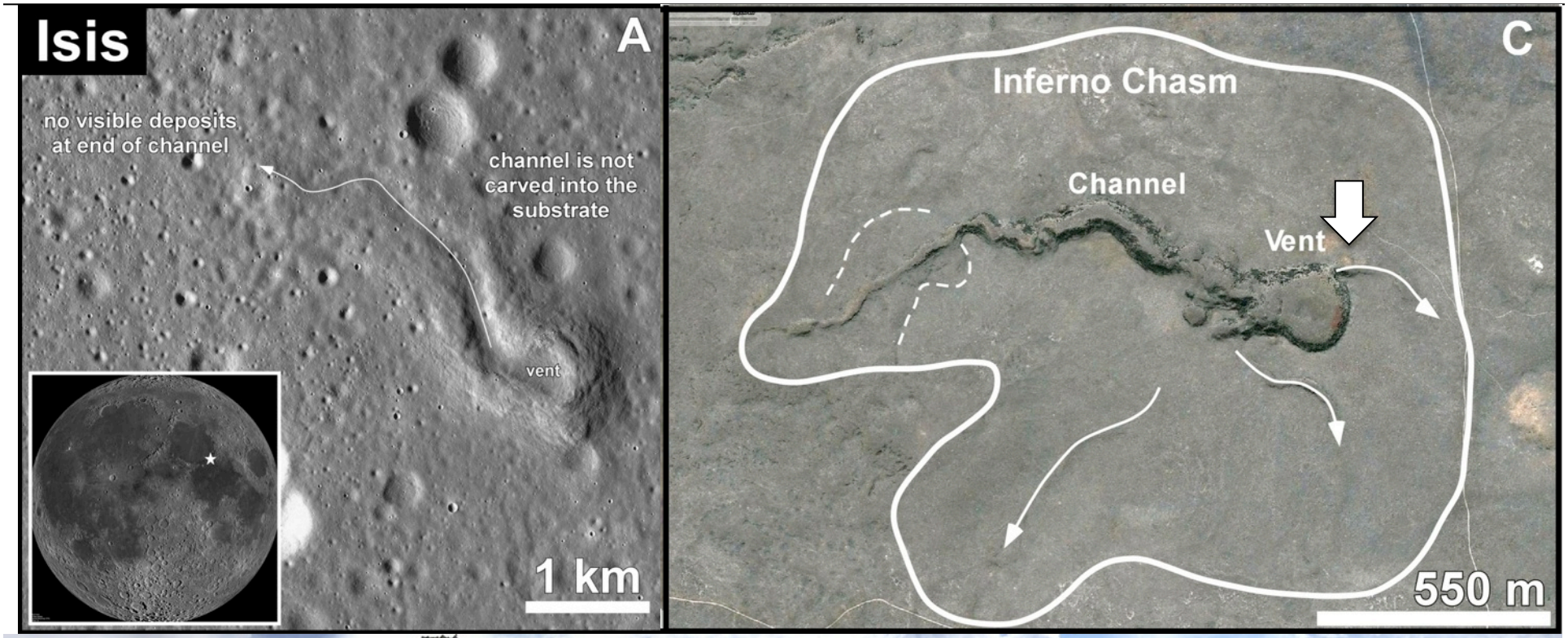
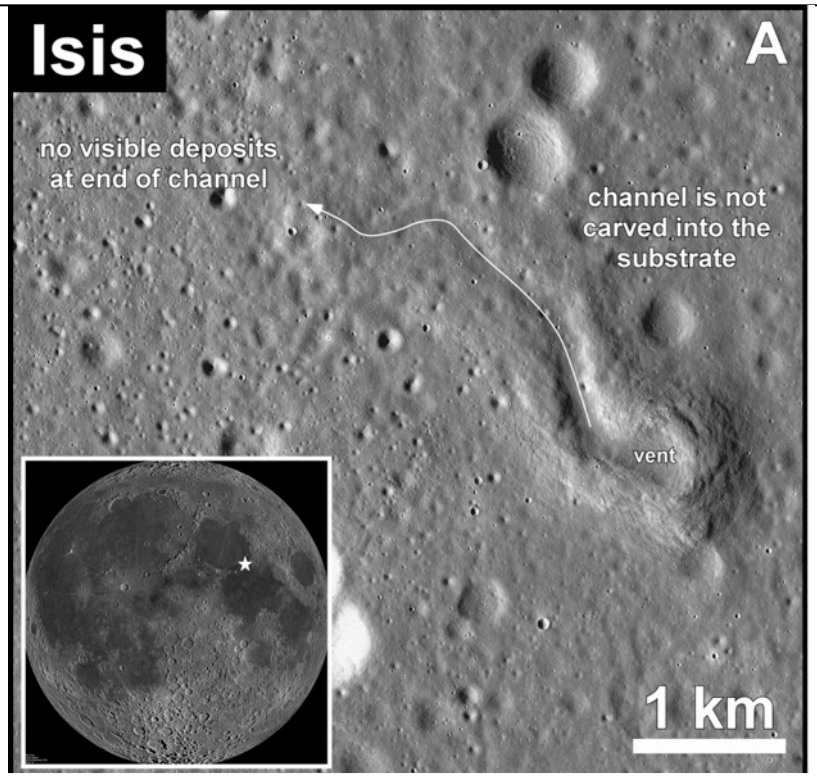
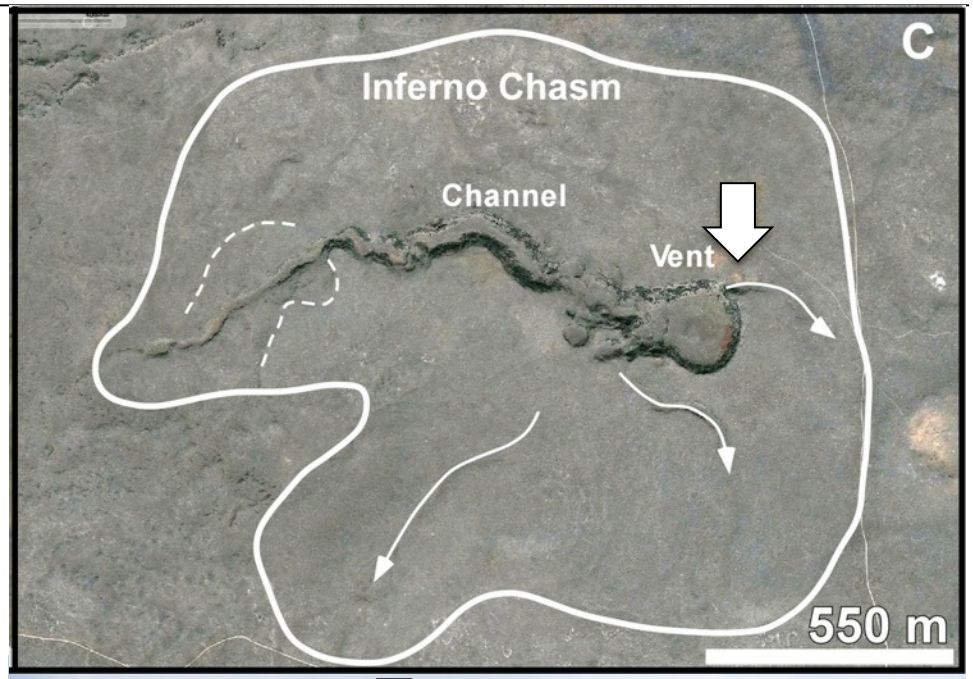
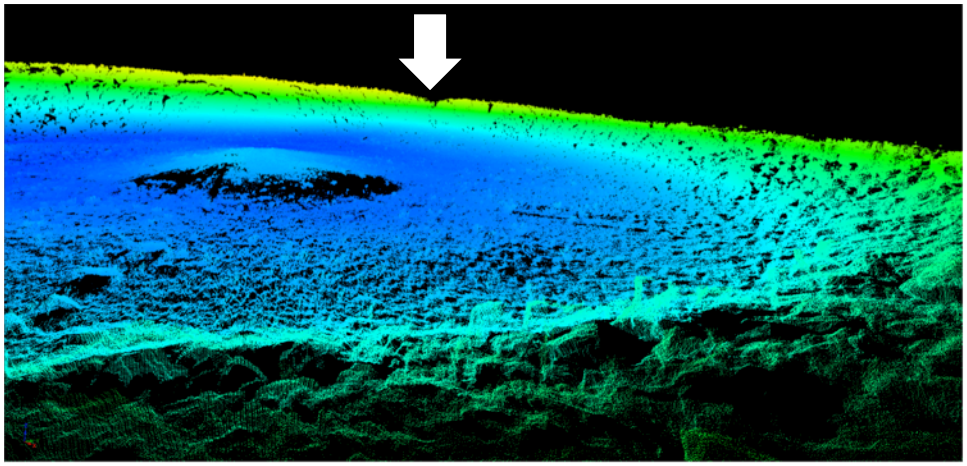
Lunar Rilles

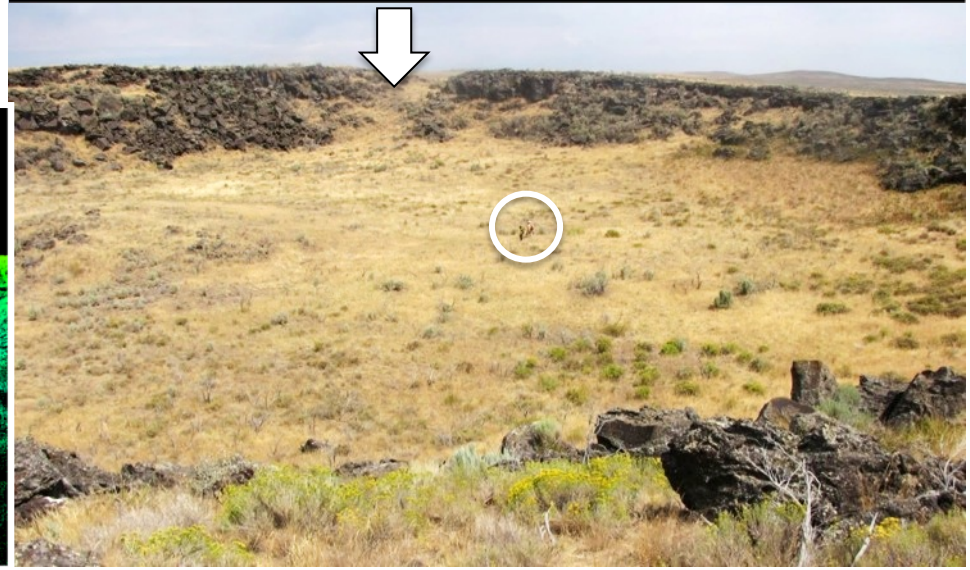


Lunar Rilles

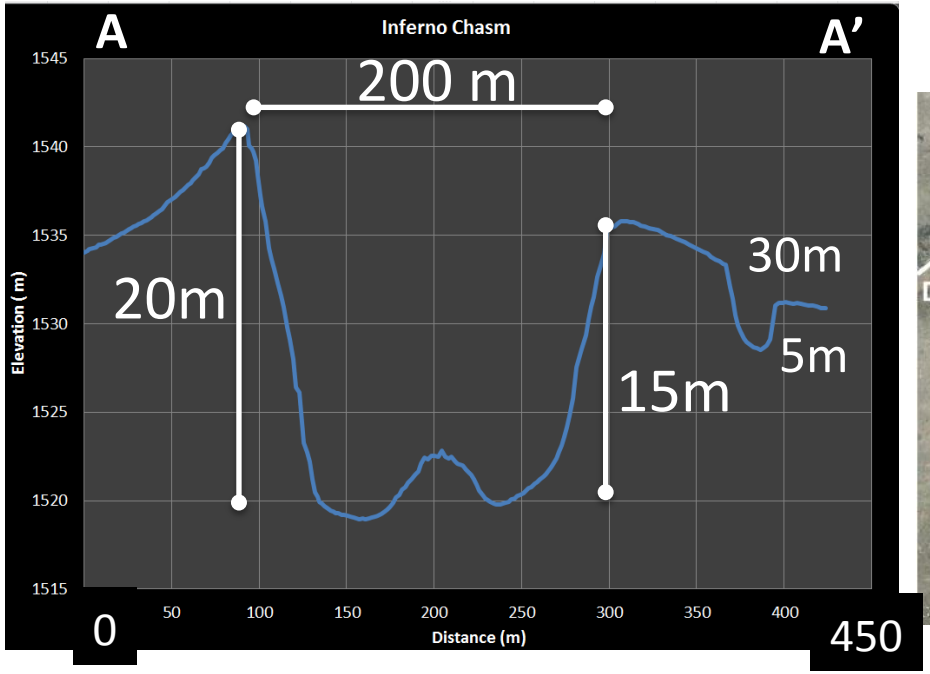


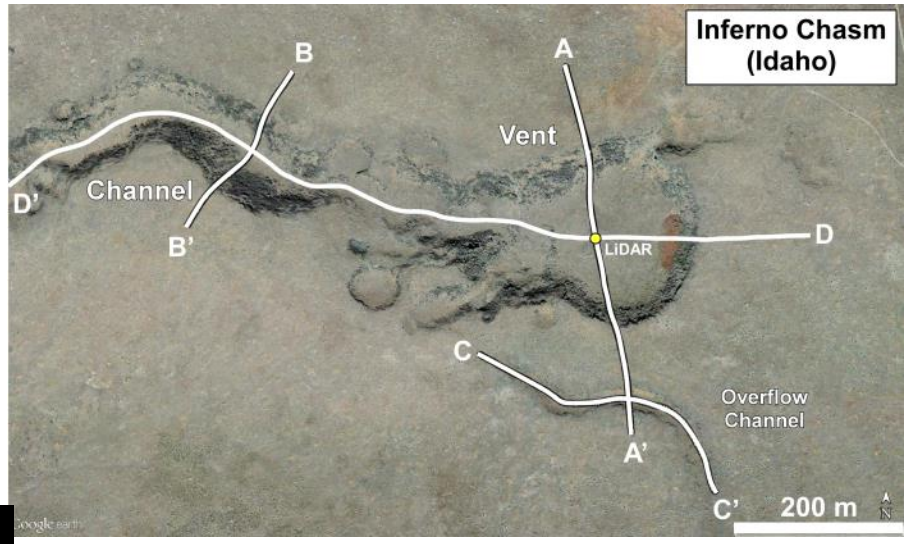


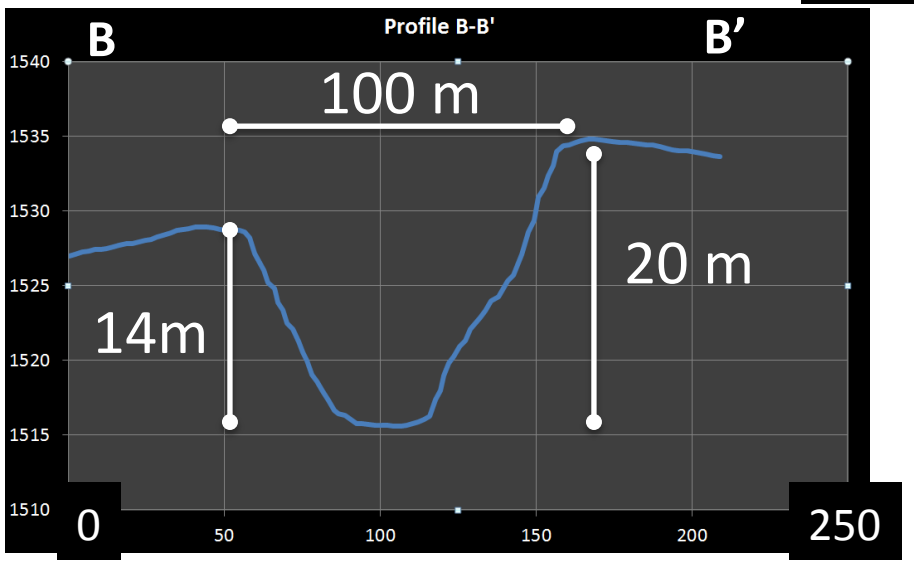


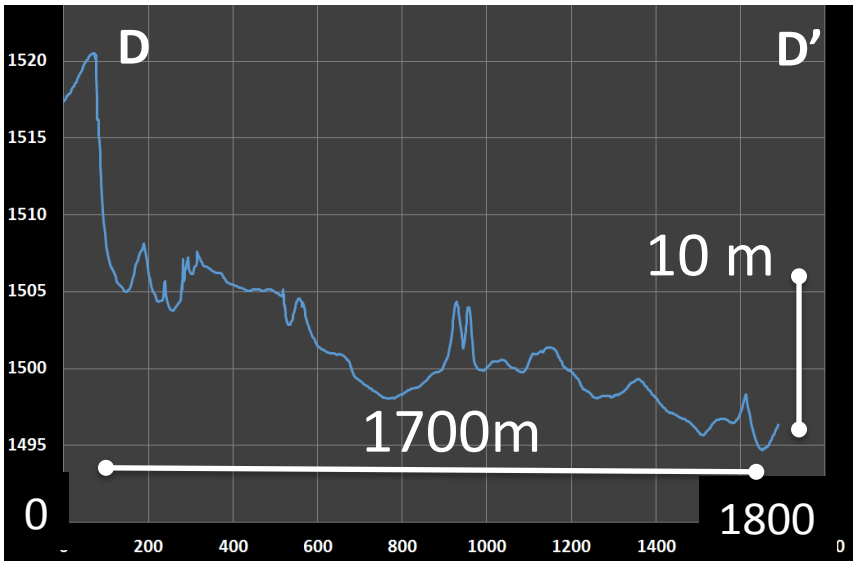


DGPS – Profiles

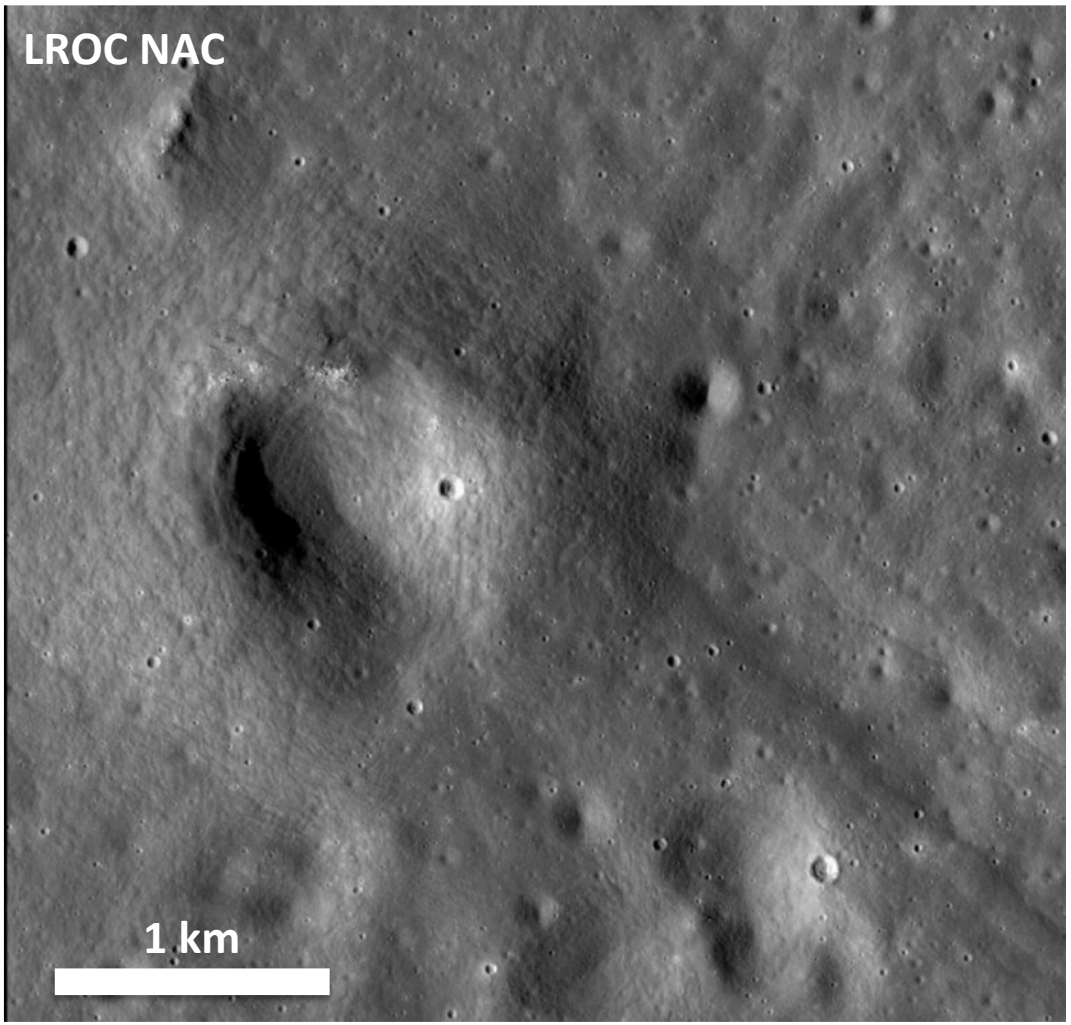




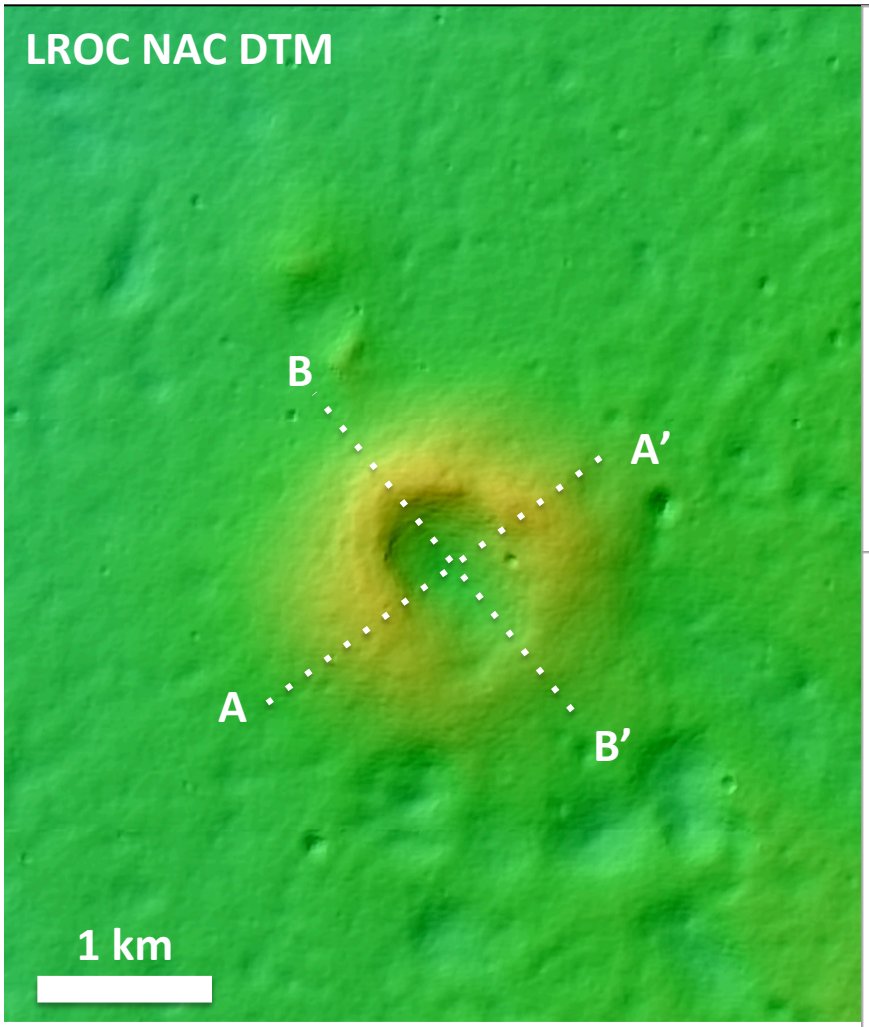


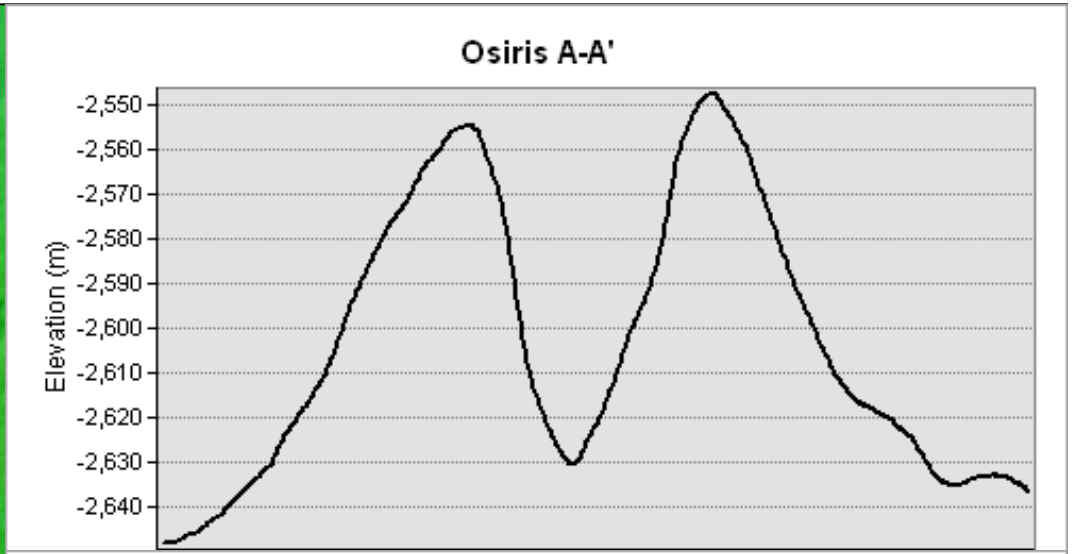


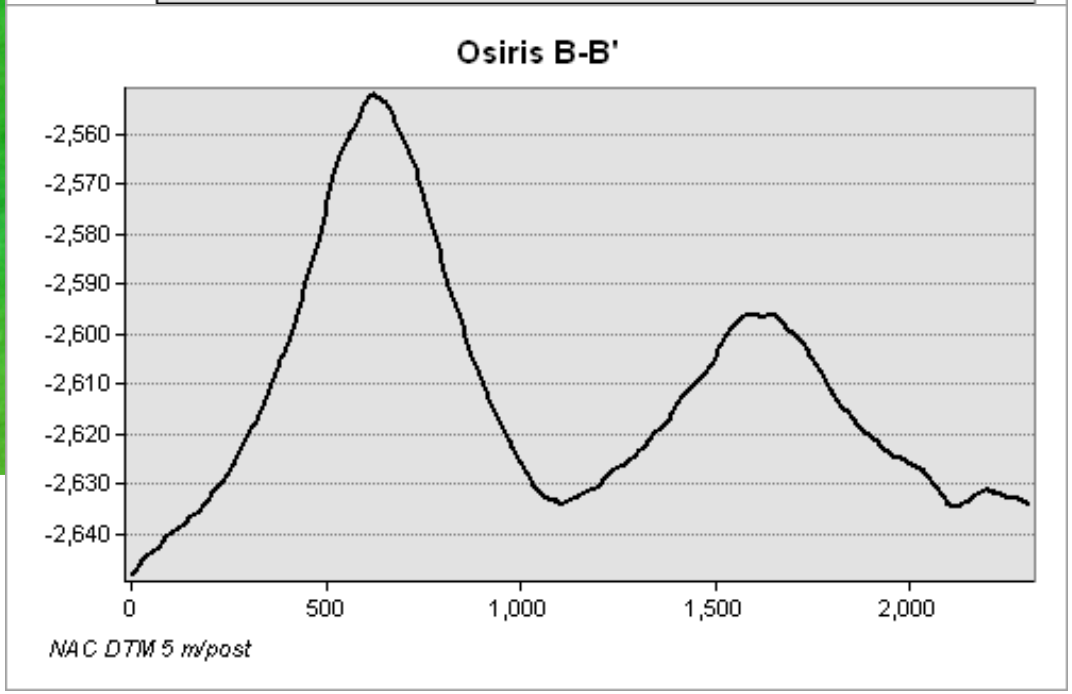
Osiris



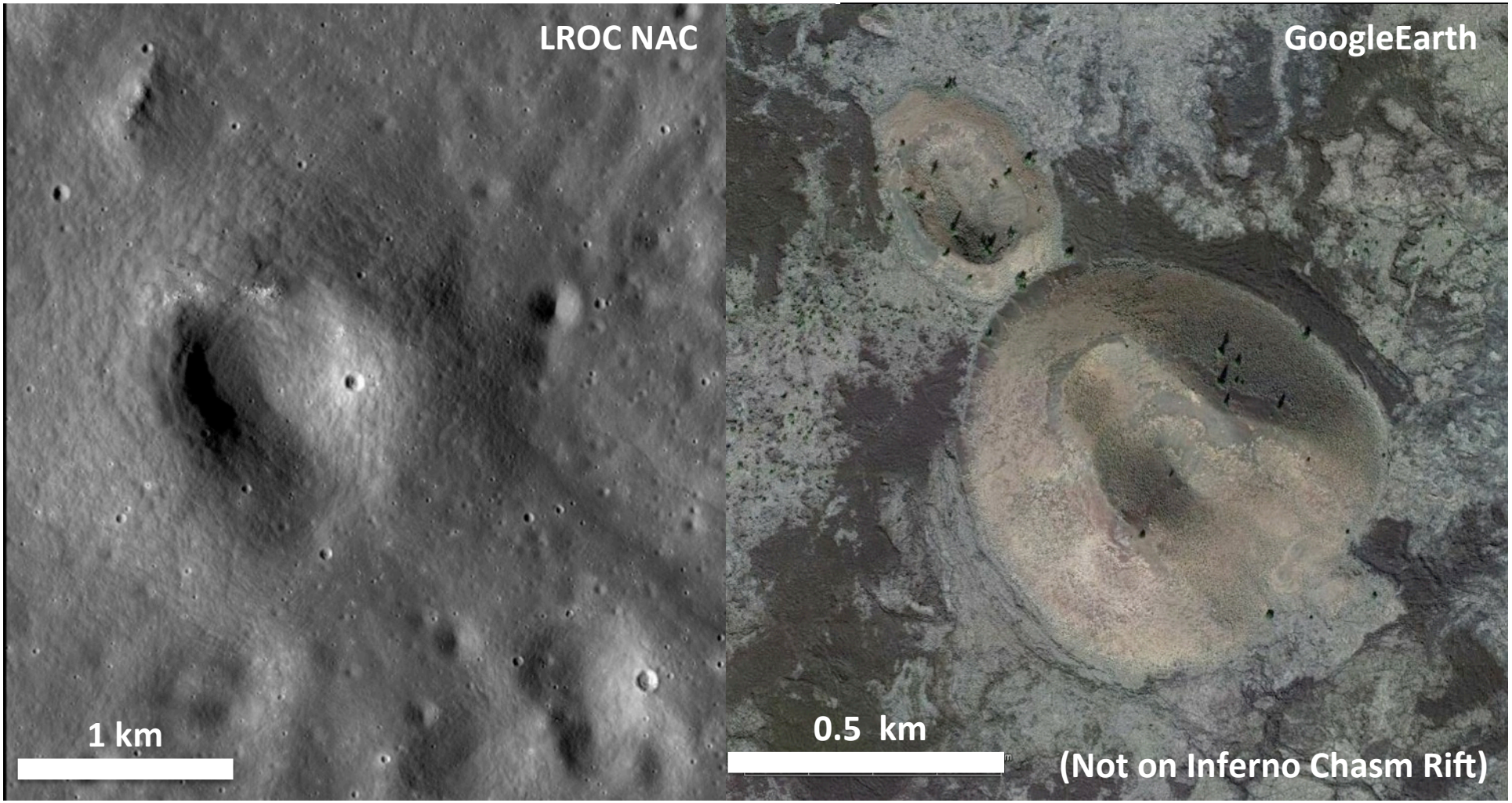
Osiris


LROC NAC DTM
B
A'
A
B'
1 km

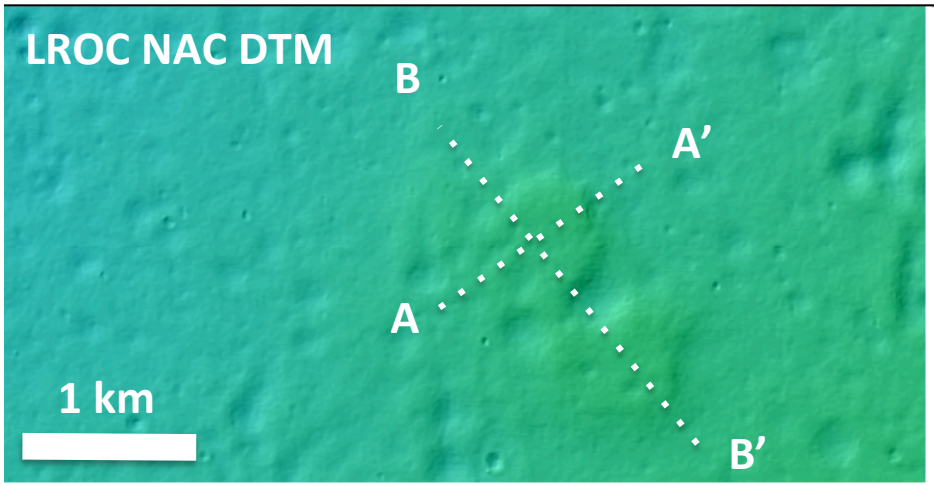

Osiris A-A'
Elevation (m)
-2,550
-2,560
-2,570
-2,580
-2,590
-2,600
-2,610
-2,620
-2,630
-2,640

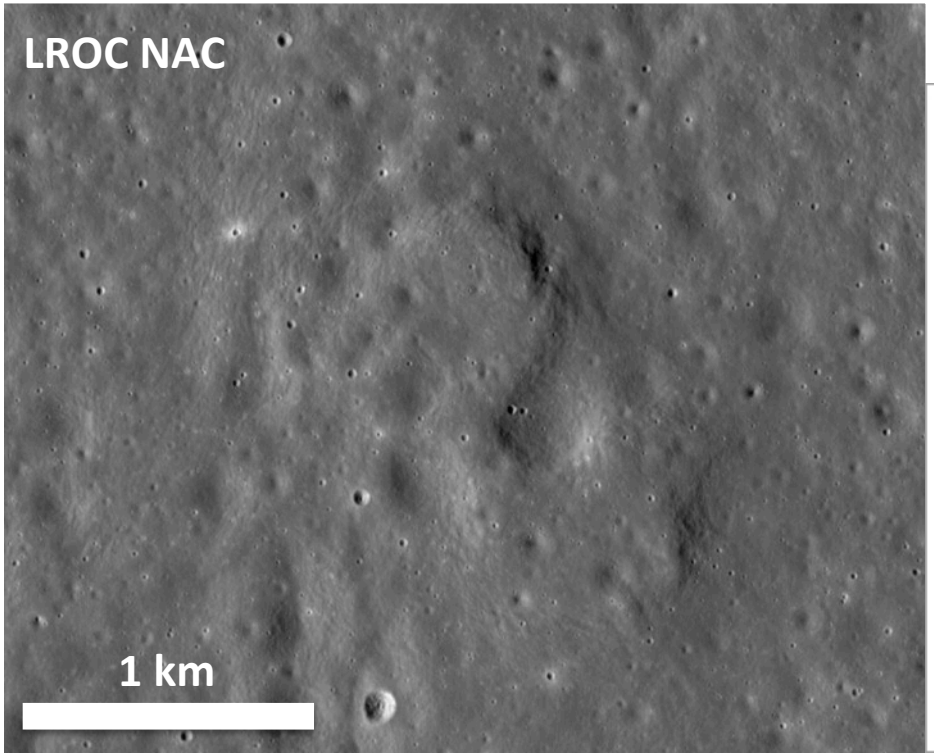

Osiris B-B'
-2,560
-2,570
-2,580
-2,590
-2,600
-2,610
-2,620
-2,630
-2,640
0
500
1,000
1,500
2,000
NAC DTM 5 m/post

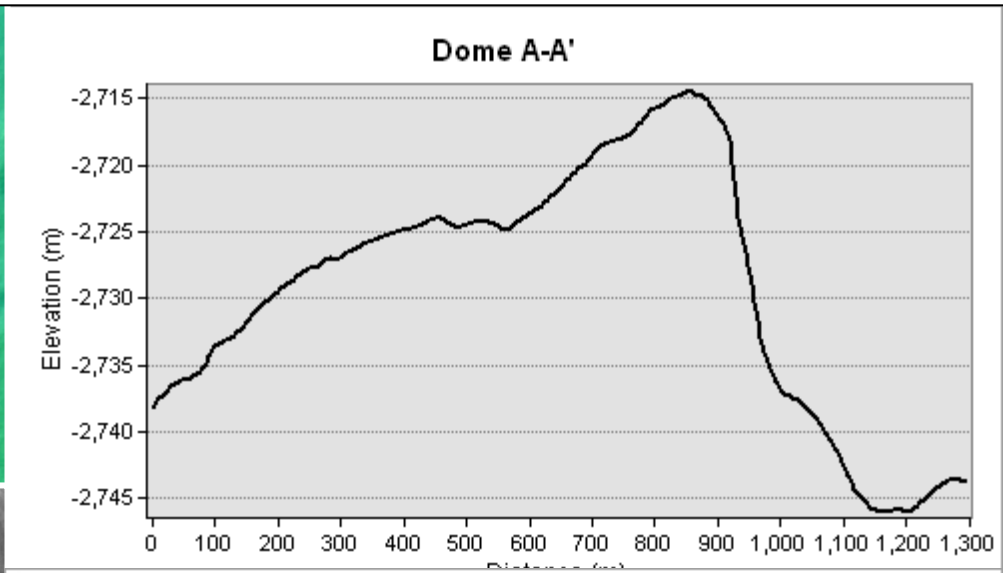
Osiris

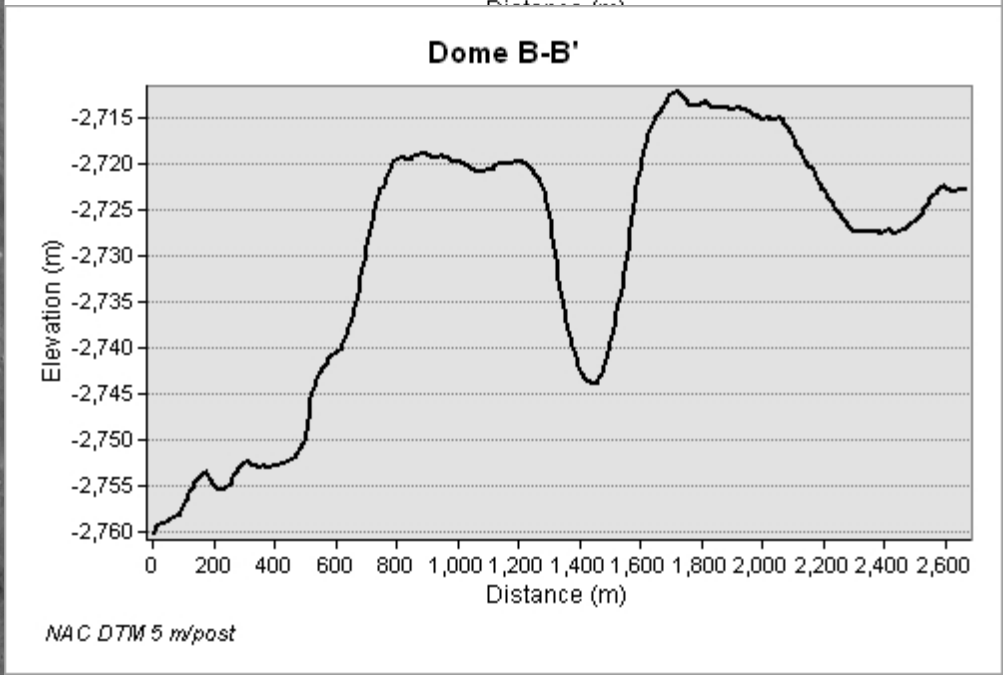


Flat Topped Dome (?)



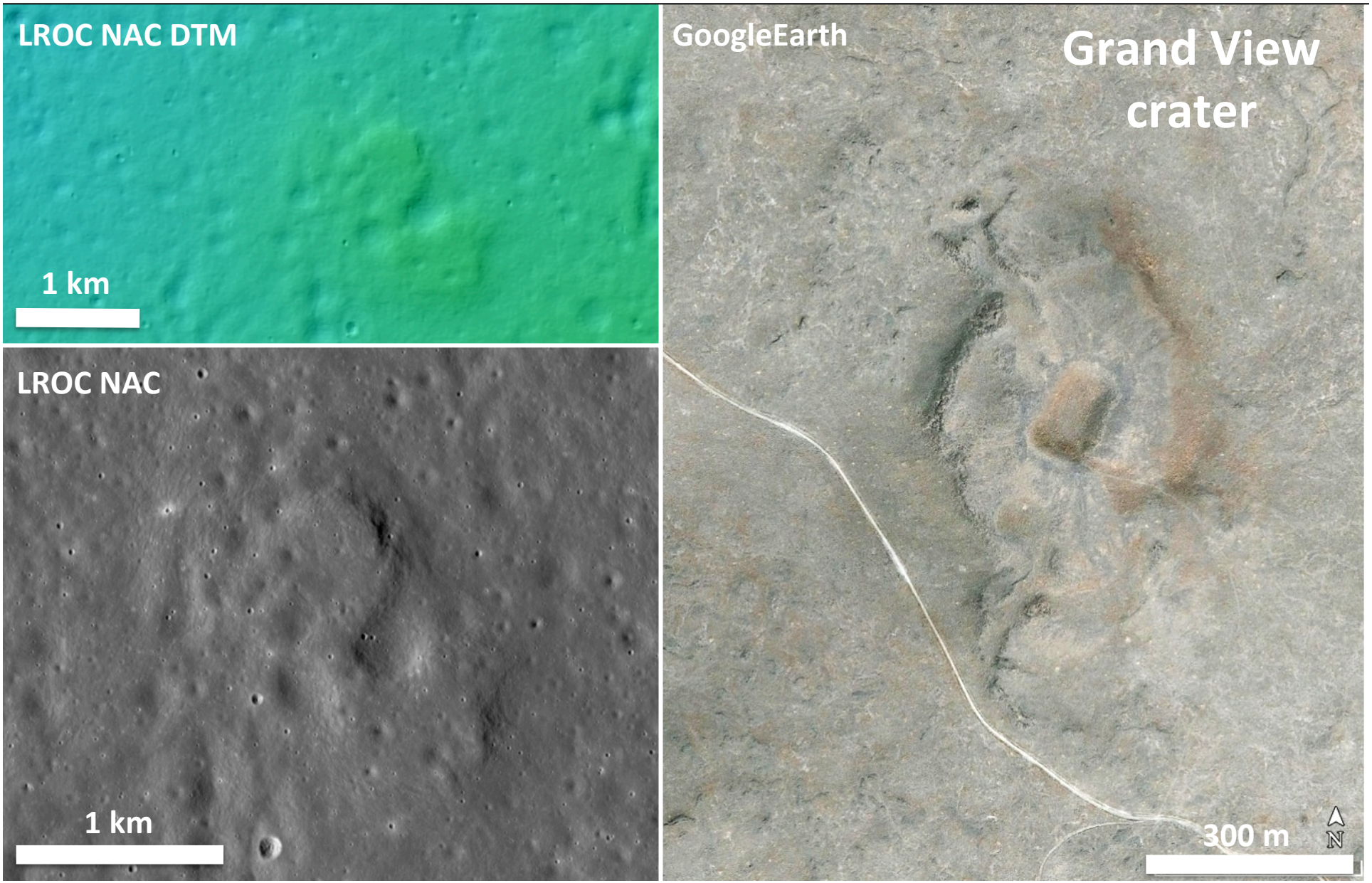




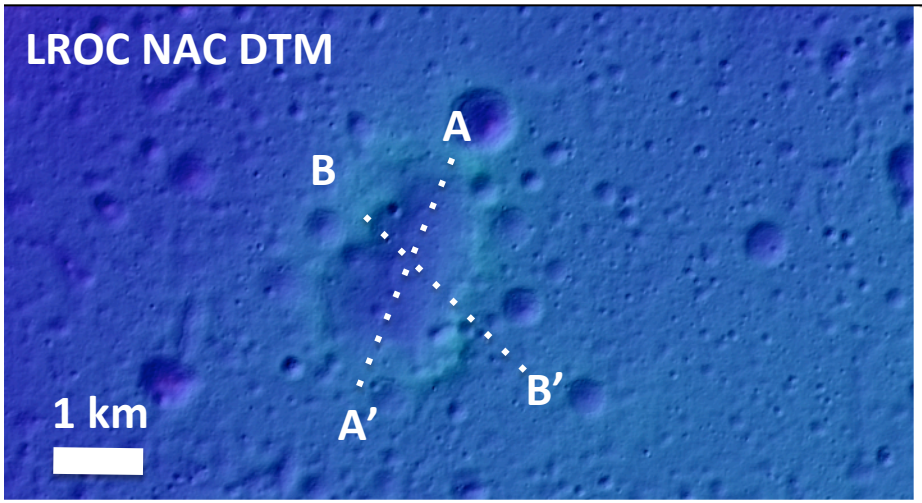


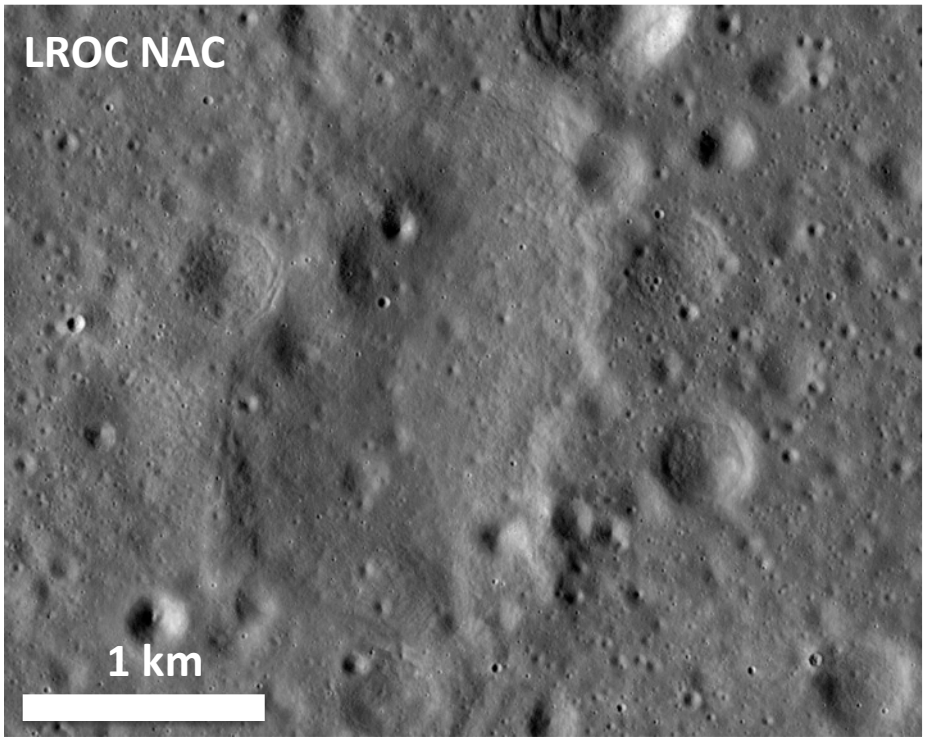
NAC DTM 5 m/post

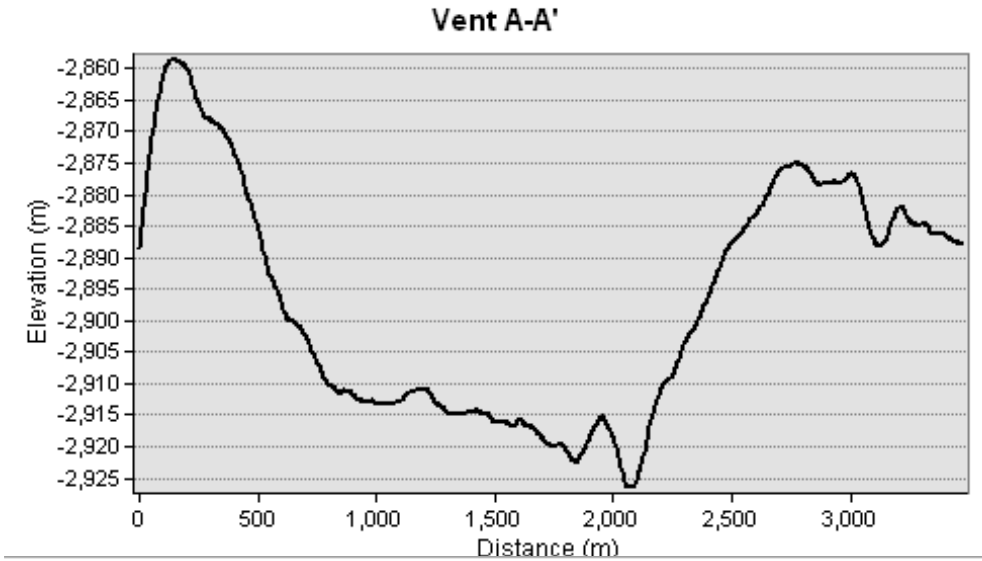
Flat Topped Dome (?)

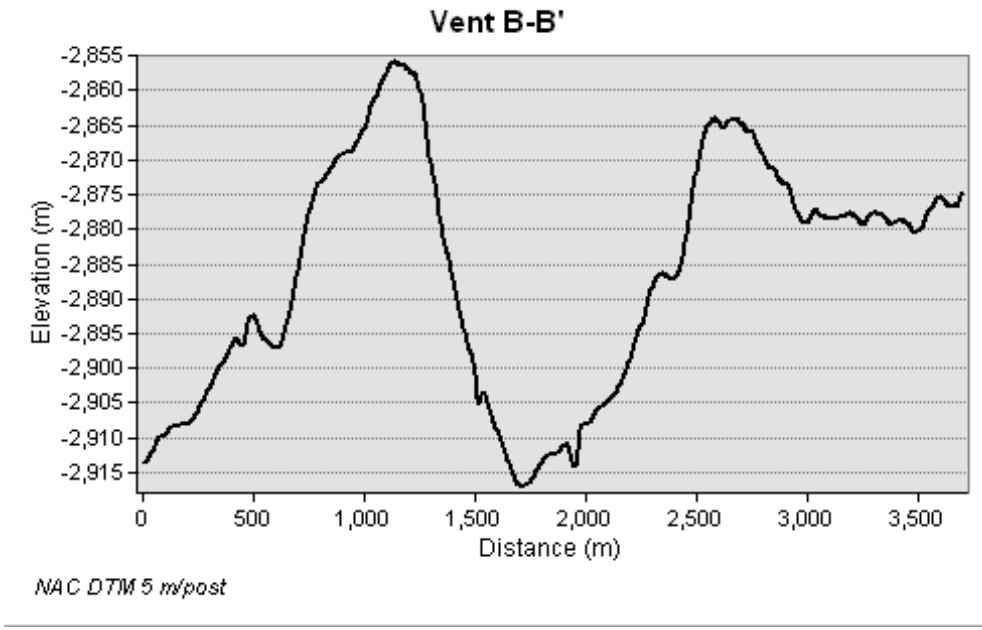


Vent (?)

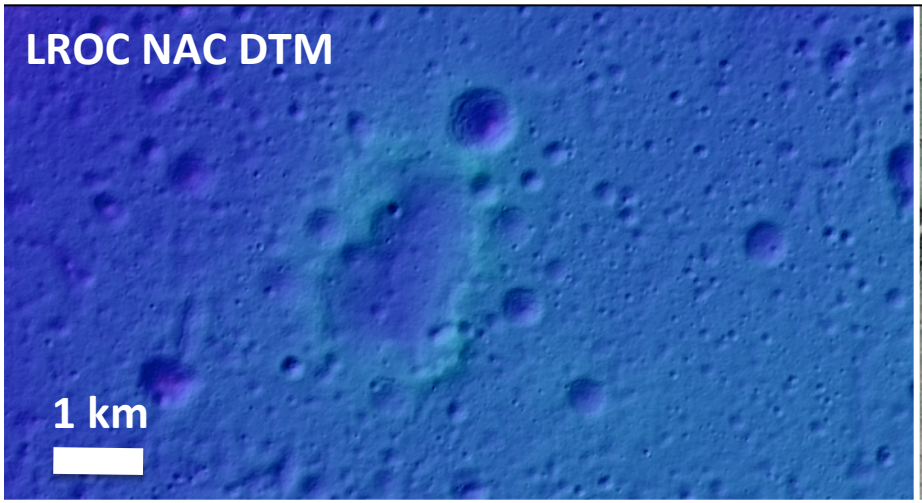

LROC NAC DTM
A
B
B’
A’
1 km

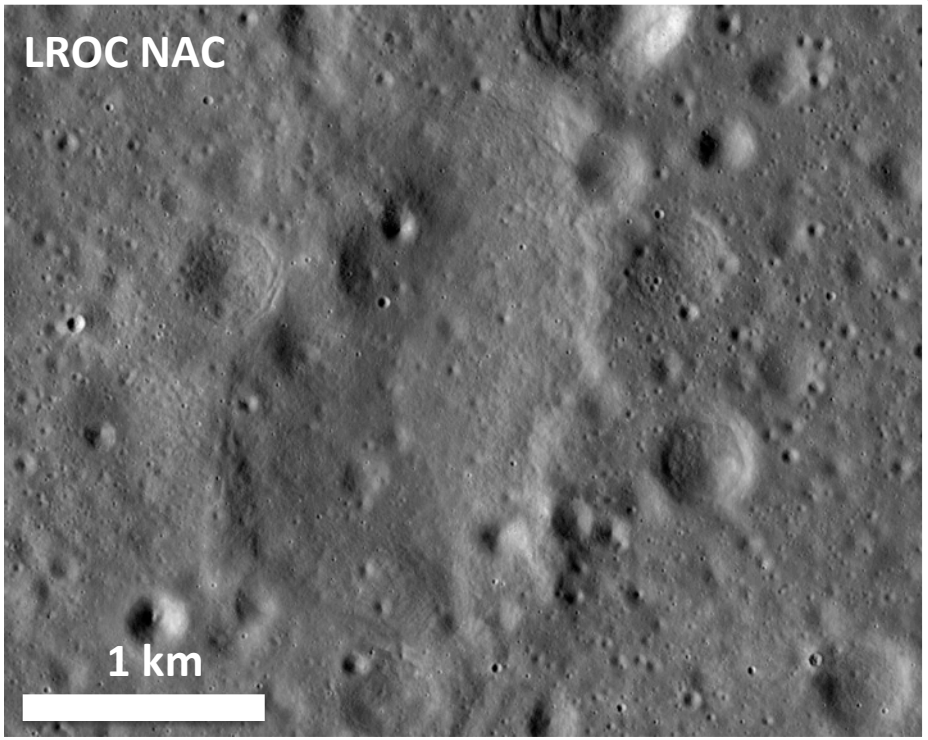

LROC NAC
1 km


Vent A-A'
Elevation (m)
-2,860
-2,865
-2,870
-2,875
-2,880
-2,885
-2,890
-2,895
-2,900
-2,905
-2,910
-2,915
-2,920
-2,925
0
500
1,000
1,500
2,000
2,500
3,000
Distance (m)

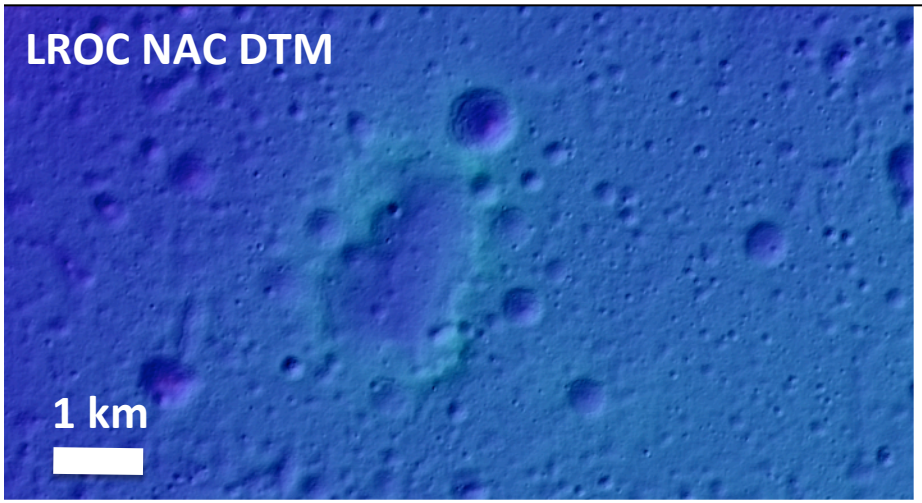

Vent B-B'
Elevation (m)
-2,855
-2,860
-2,865
-2,870
-2,875
-2,880
-2,885
-2,890
-2,895
-2,900
-2,905
-2,910
-2,915
0
500
1,000
1,500
2,000
2,500
3,000
3,500
Distance (m)
NAC DTM 5 m/post

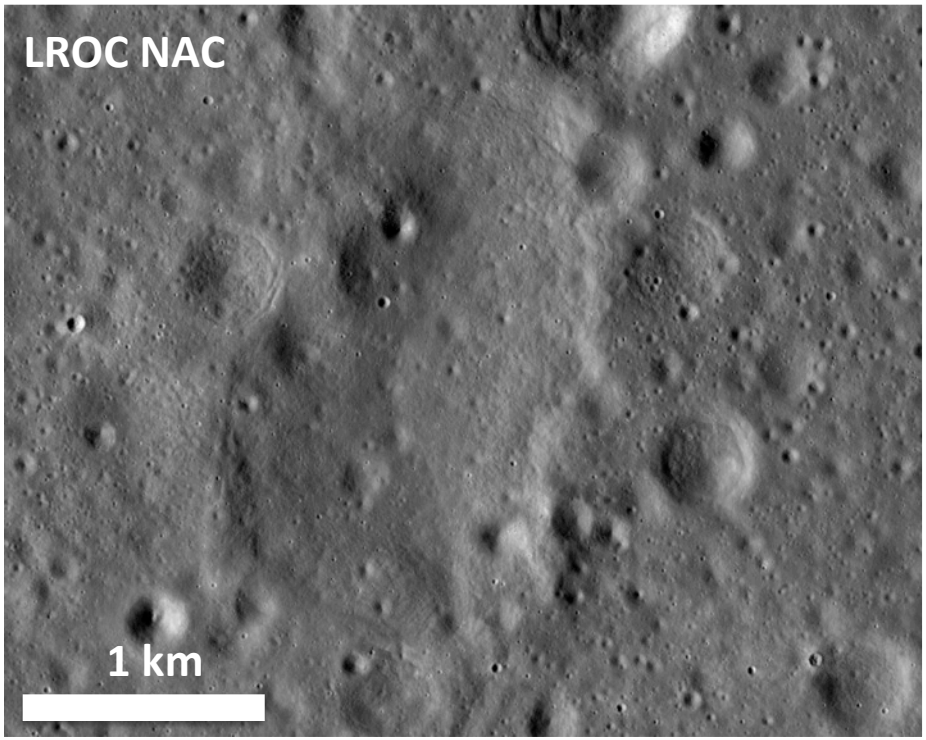
Vent (?)



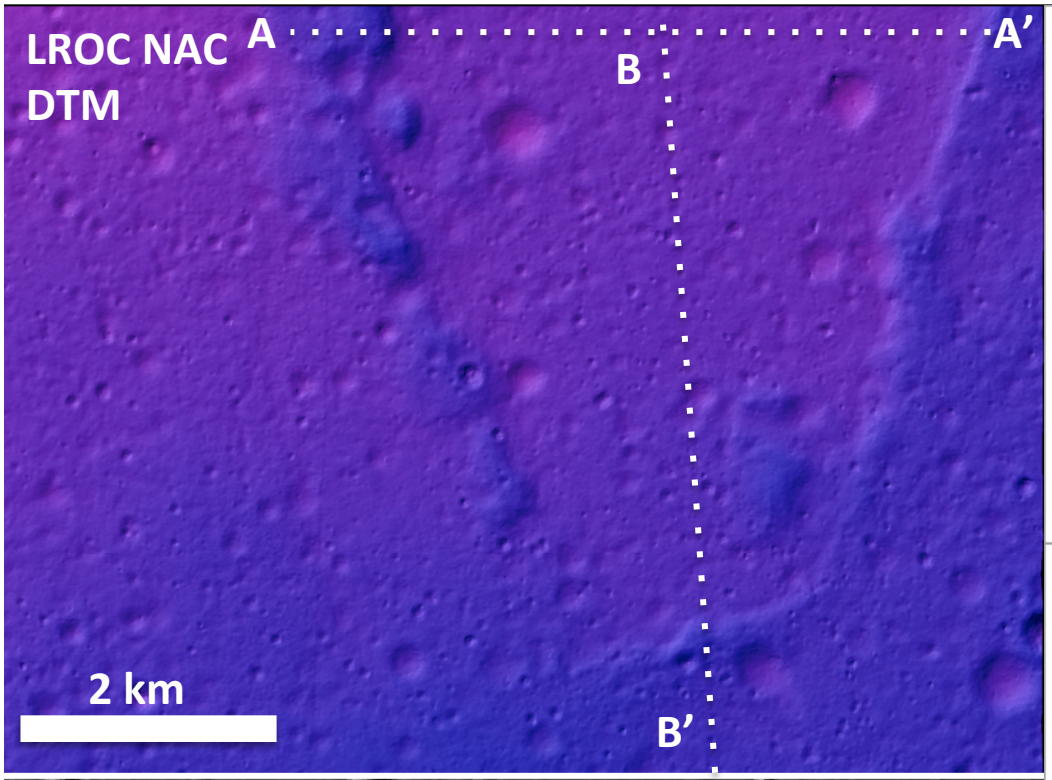


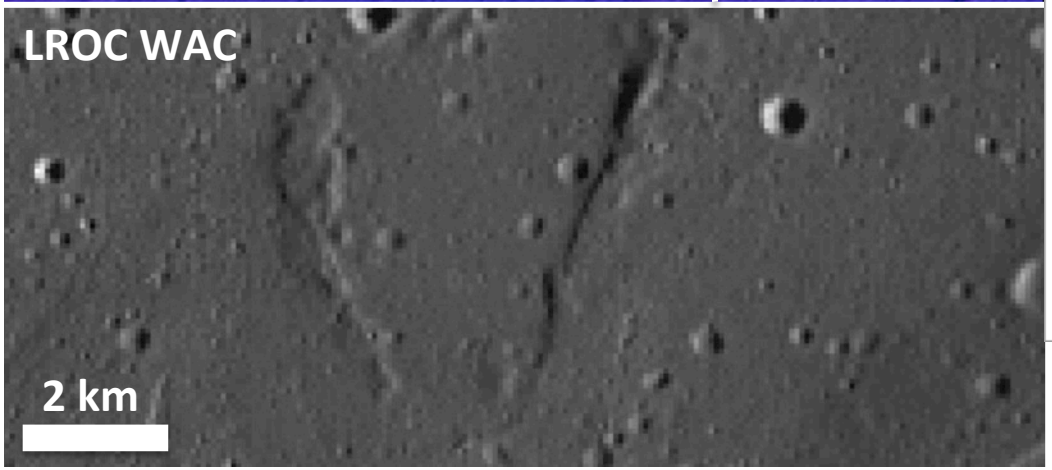
Vent (?)

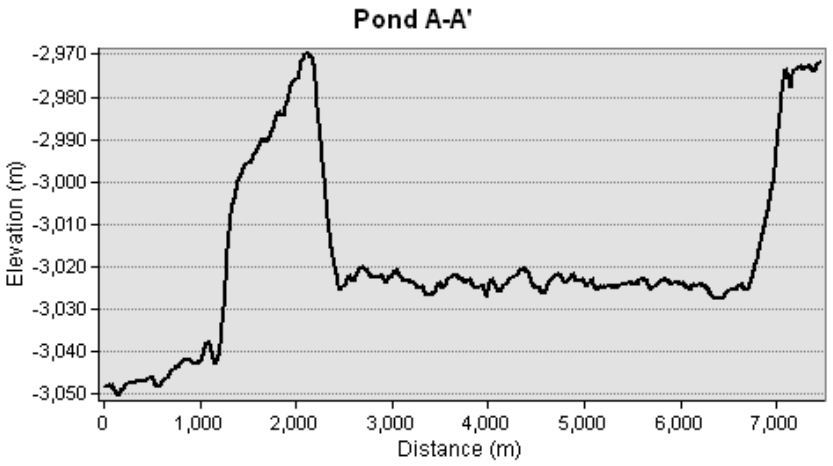


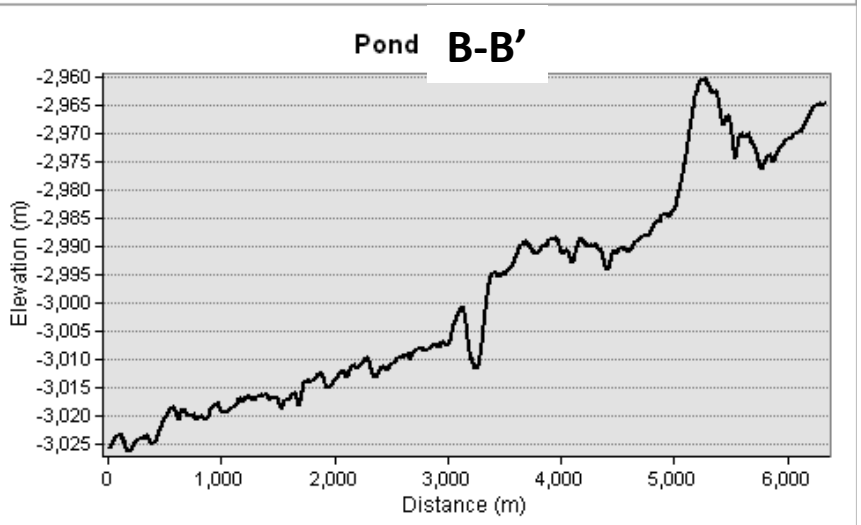


Lava Pond (?)

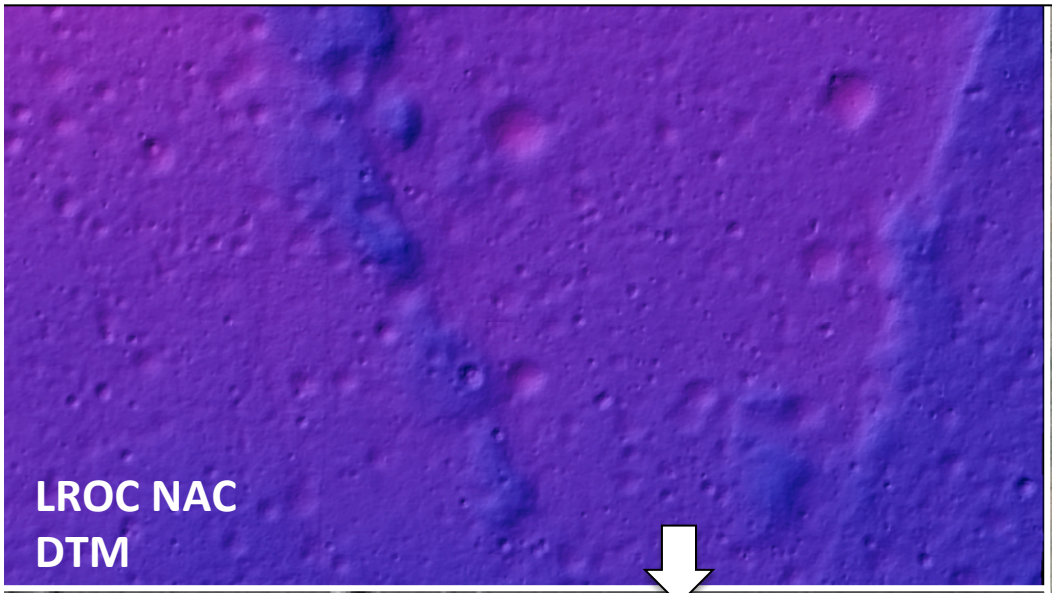

LROC NAC DTM
A
A’
B
B’
2 km

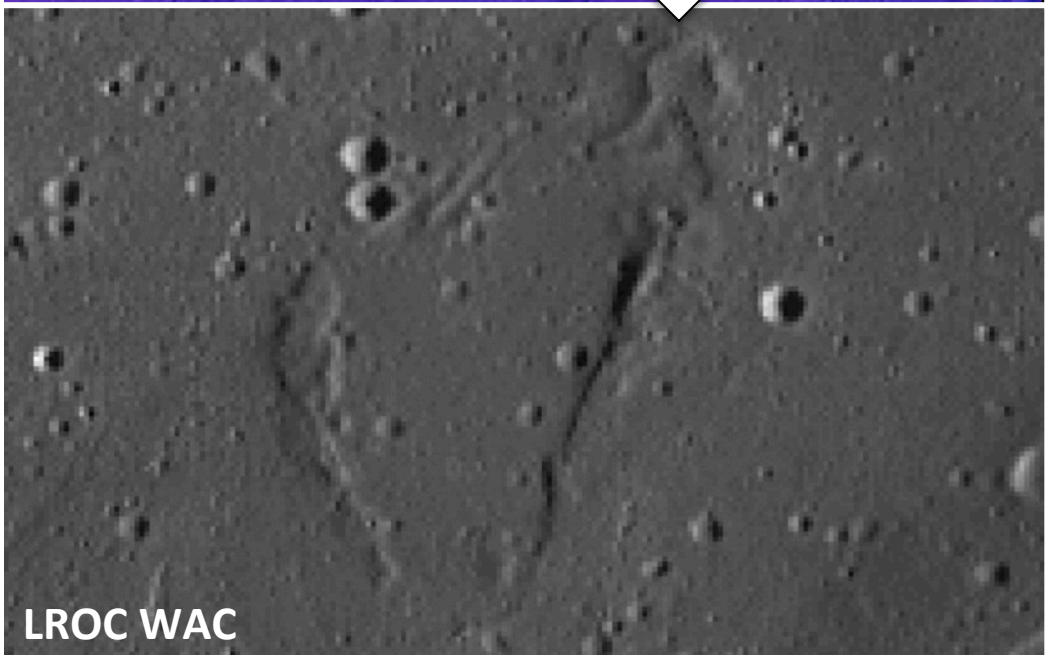

LROC WAC
2 km

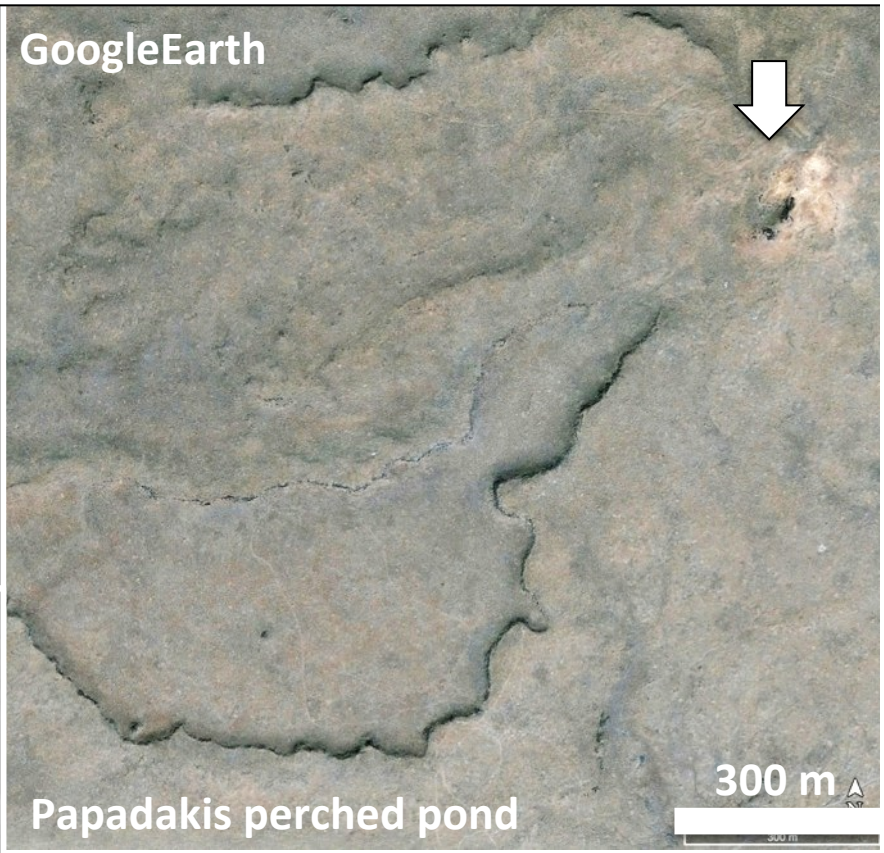

Pond A-A'
Elevation (m)
-2,970
-2,980
-2,990
-3,000
-3,010
-3,020
-3,030
-3,040
-3,050
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
Distance (m)
NAC DTM 5 m/post


Pond B-B’
Elevation (m)
-2,960
-2,965
-2,970
-2,975
-2,980
-2,985
-2,990
-2,995
-3,000
-3,005
-3,010
-3,015
-3,020
-3,025
0
1,000
2,000
3,000
4,000
5,000
6,000
Distance (m)
NAC DTM 5 m/post

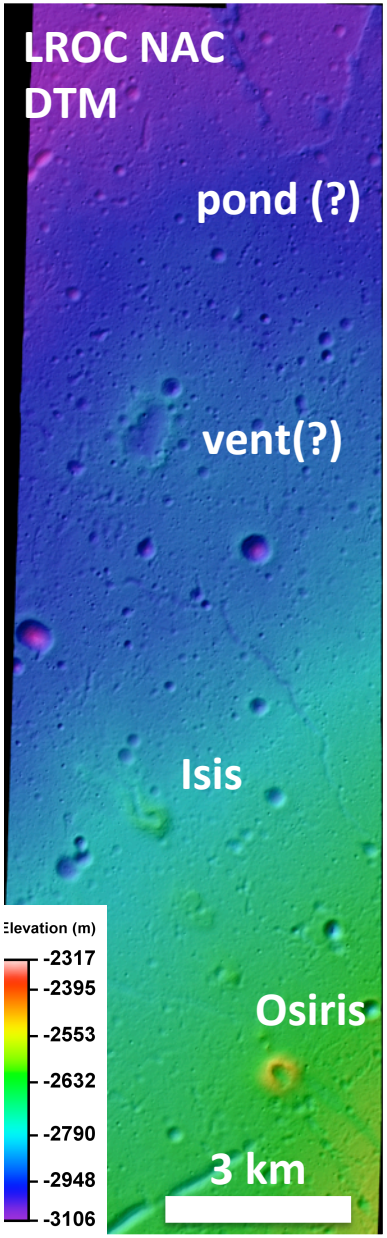
Lava Pond (?)

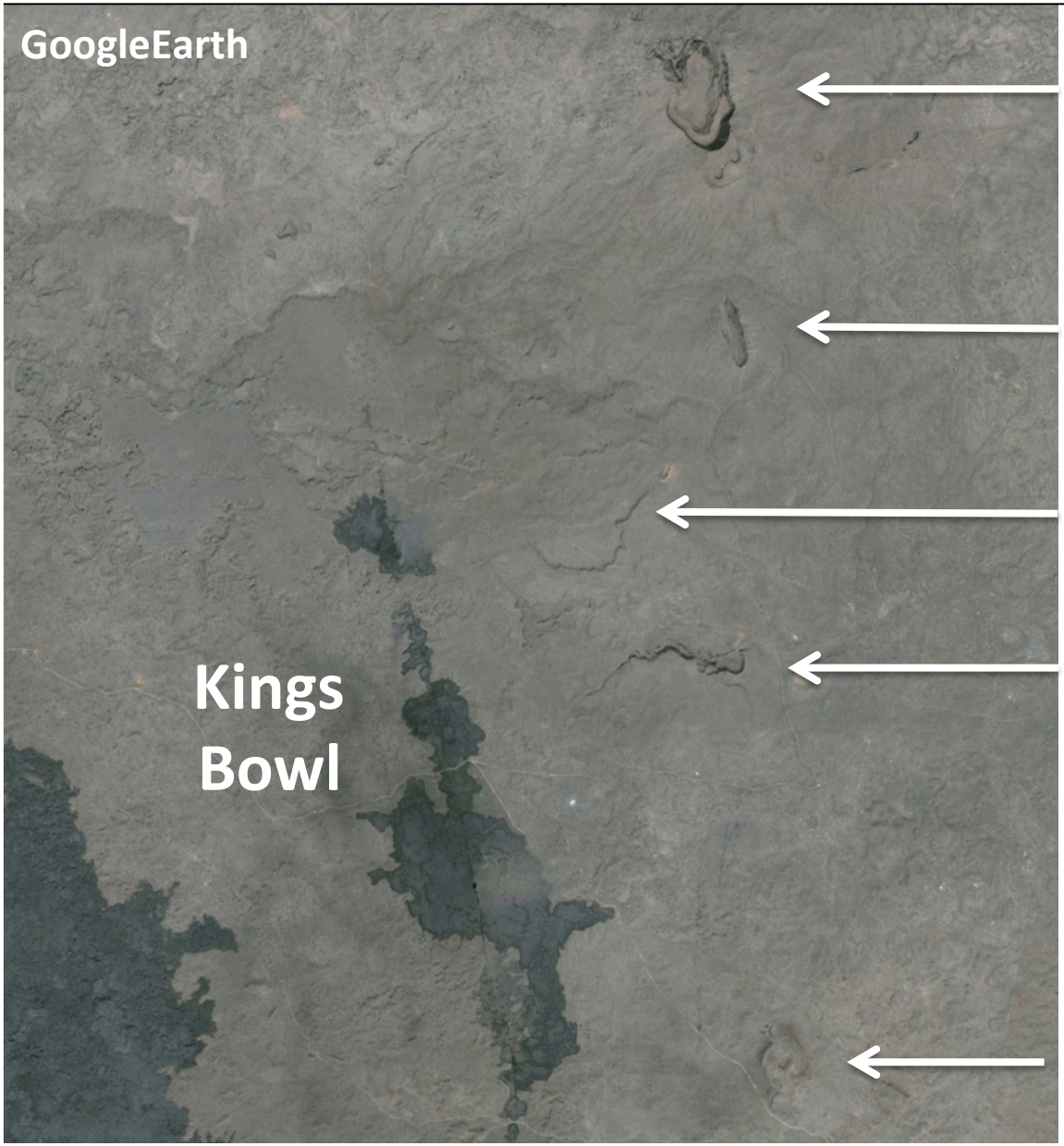

LROC NAC
DTM


LROC WAC


GoogleEarth
Papadakis perched pond
300 m

Comparing Earth to the Moon





Wild Horse Corral

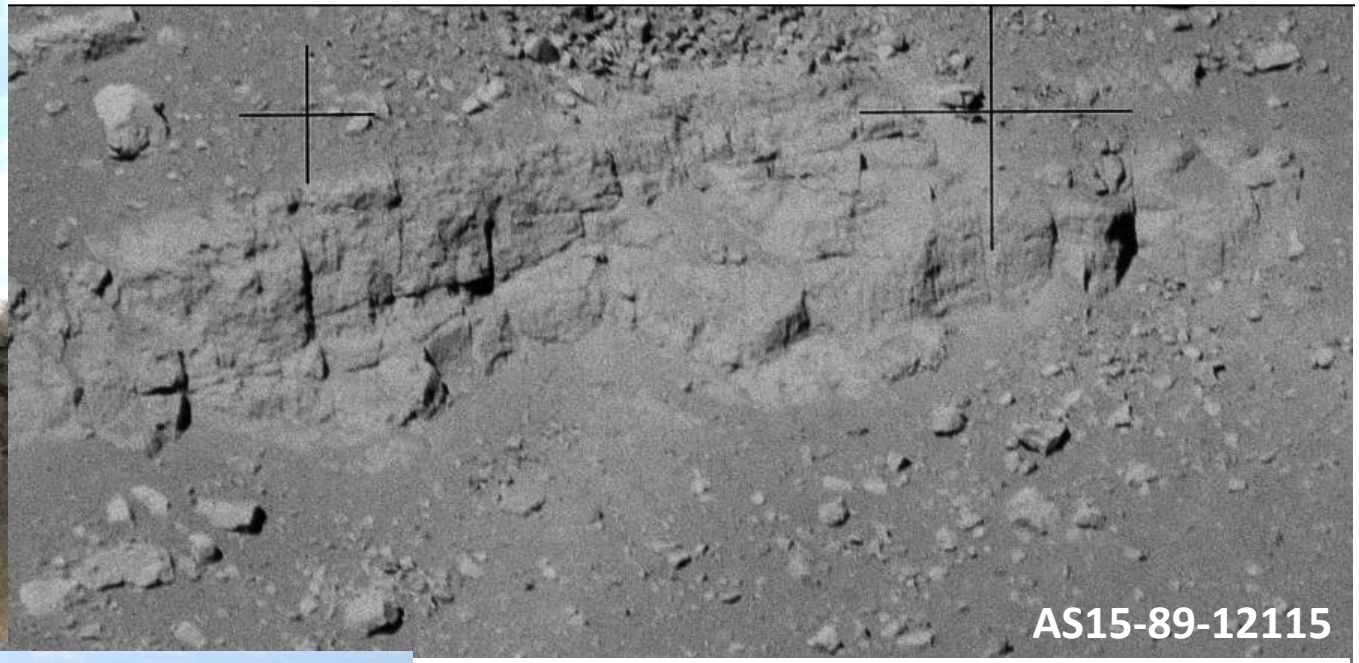
Cottrell's
Blowout

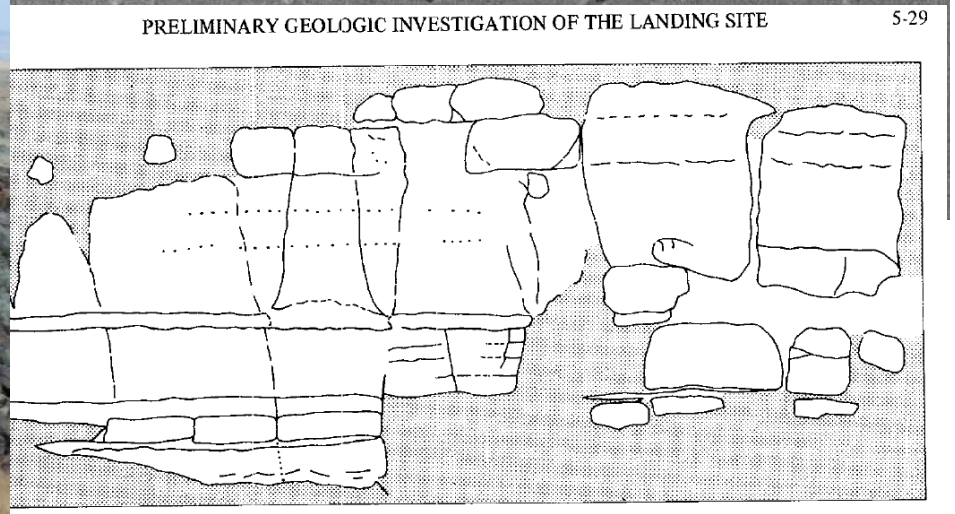
Papadakis
perched pond

Inferno Chasm

Grand View crater

Stratigraphy at Hadley Rille





PRELIMINARY GEOLOGIC INVESTIGATION OF THE LANDING SITE 5-29

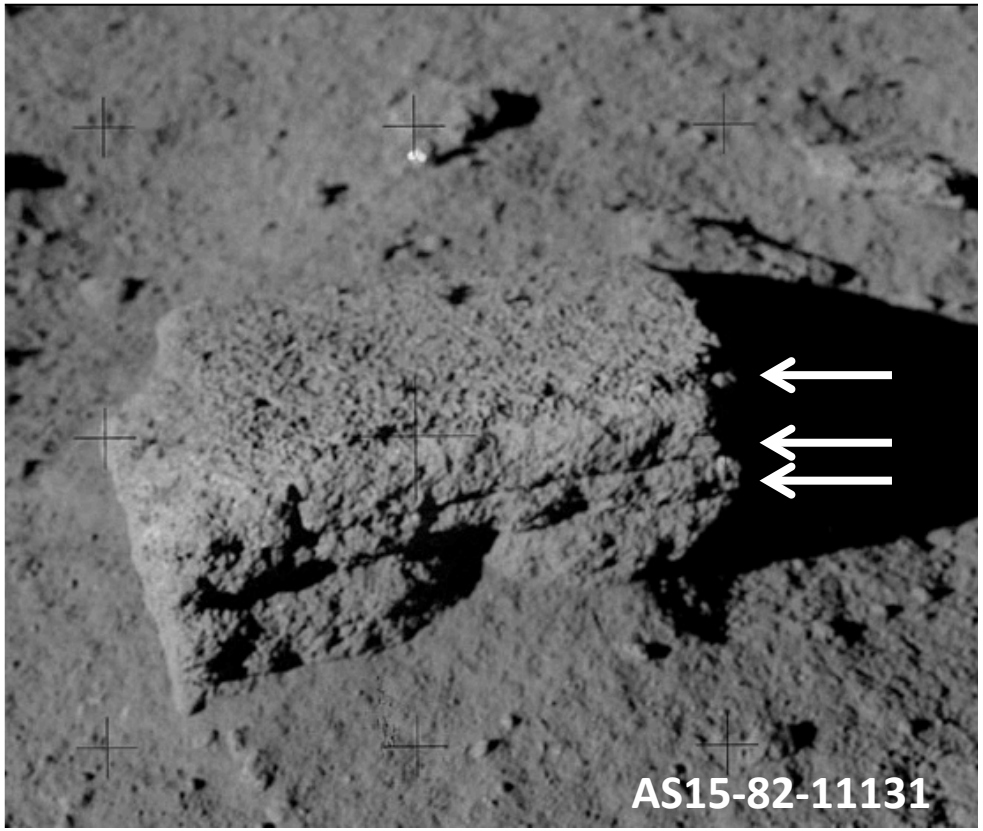
FIGURE 5-37.—Schematic drawing of layered outcrop indicated in figure 5-11. Outcrop is approximately 8 m high.

Details in the Boulders

Irregular Horizons (welded spatter, overflows)

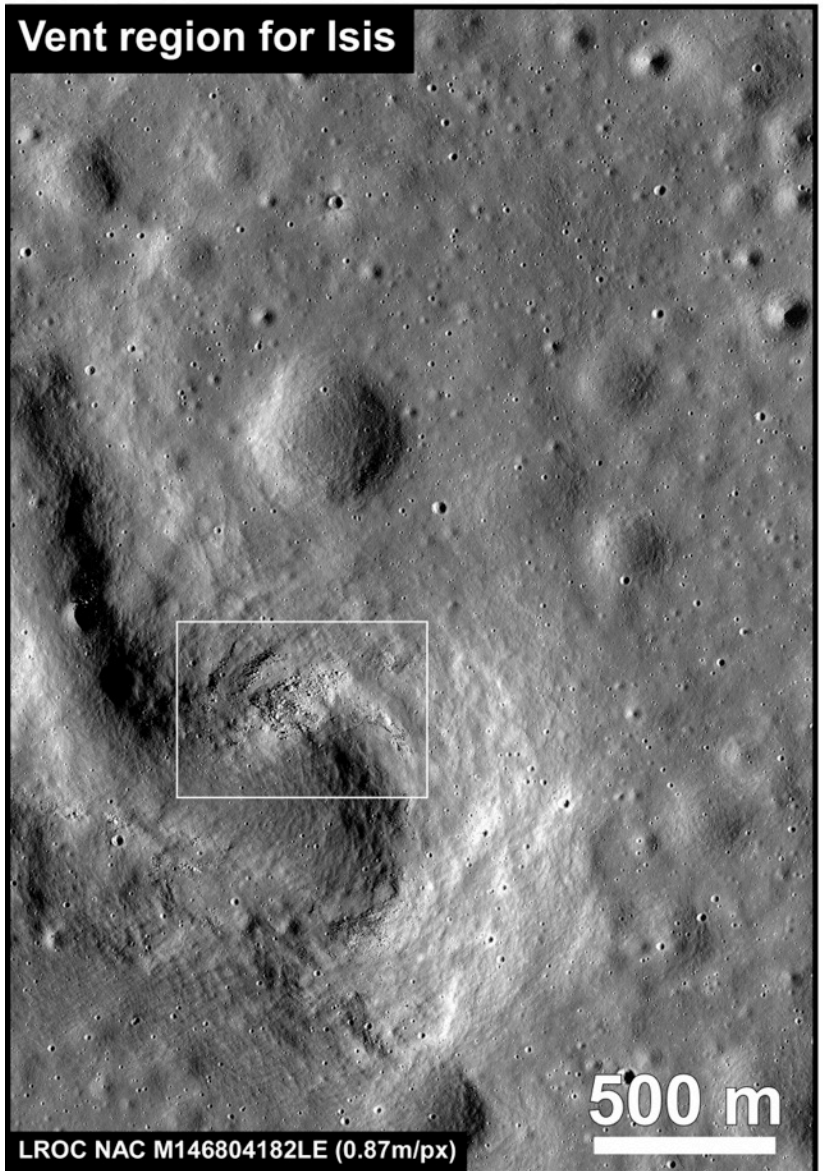
Inferno Chasm vent

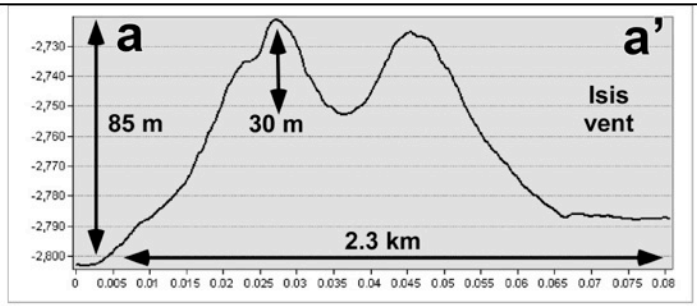
Parallel Vesicle Horizons (Inflation)

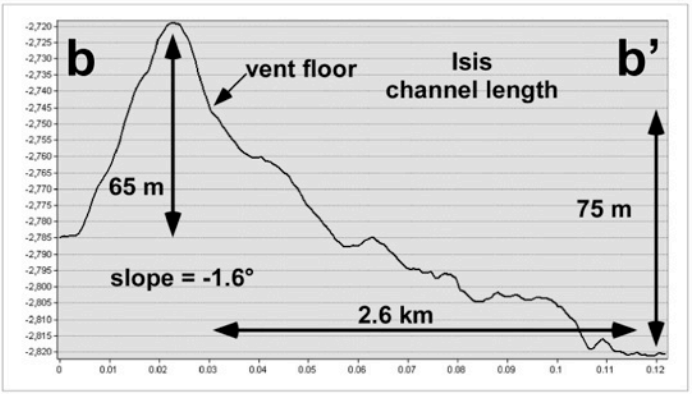


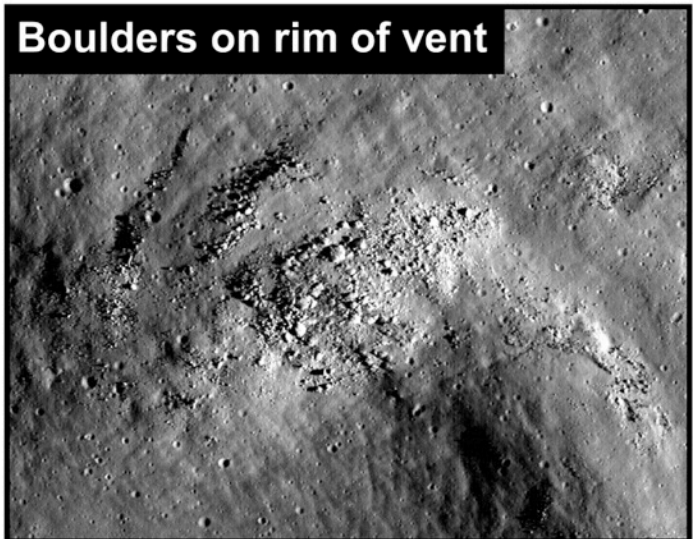
(Keszthelyi, 2008)

Details in the Boulders

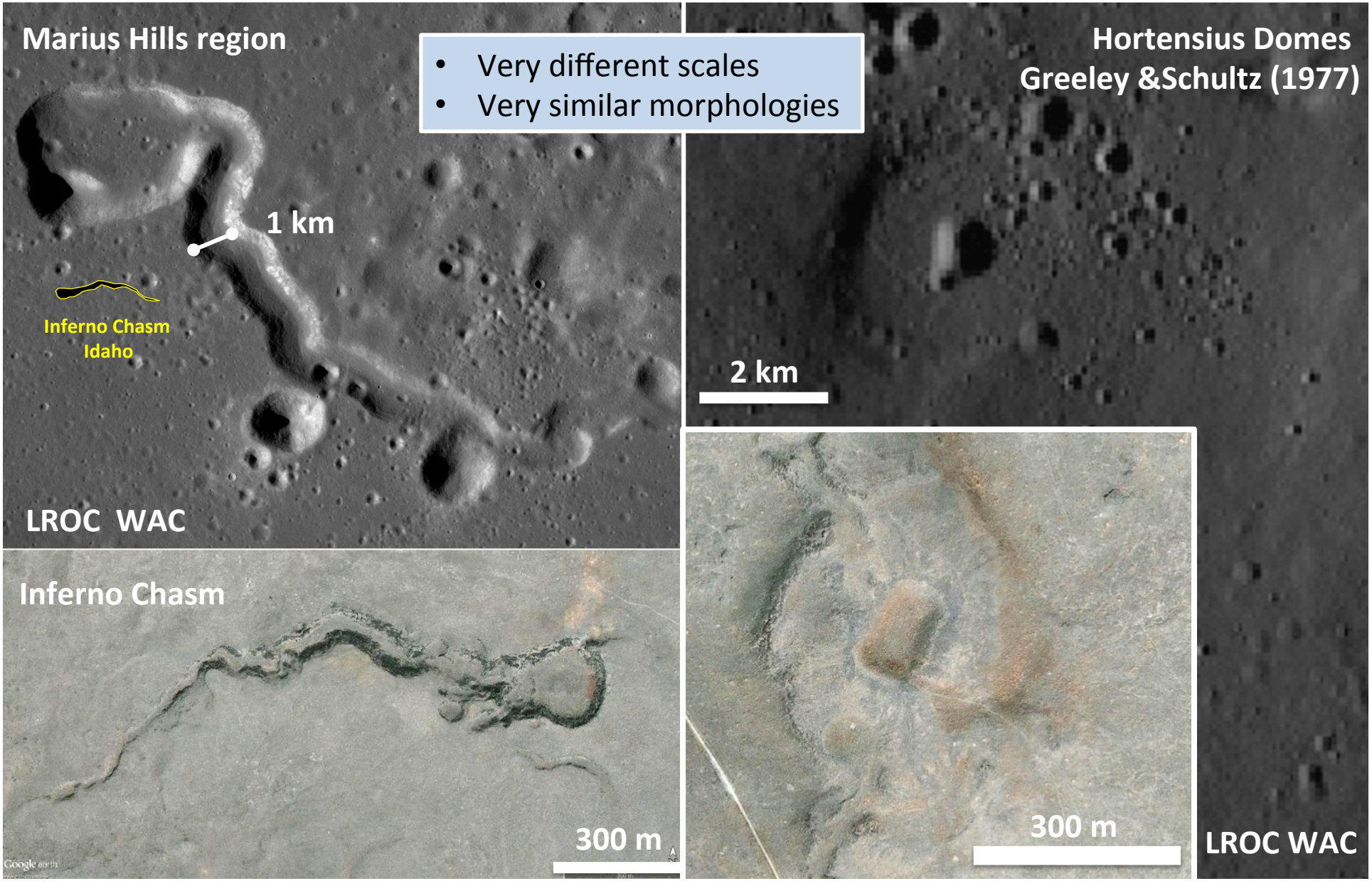








Analogs for other lunar features?



- Very different scales
- Very similar morphologies

Summary and Future Work

Field observations provide data at comparable resolutions to LROC NAC images and DTMS

Volcanic features along Inferno Chasm Rift Zone resemble Isis & Osiris, but could be a mix explosive and effusive eruptions.
(Wood, 1979; Greeley, 1982; Weitz & Head, 1999)

Stratigraphy helps to constrain eruption conditions.
(Keszthelyi, 2008; Self et al., 1998)

Continue field work to document more possible lunar analogs.
August 2015 – Field work at COTM (Greeley & Schultz, 1977)

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AS17-M-2317 Pan