Inferno Chasm Rift Zone, Idaho
A terrestrial analog for plains-style volcanism in southeastern Mare Serenitatis on the Moon?

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Comparing Earth to the Moon

LROC NAC
DTM

GoogleEarth

Wild Horse Corral
Cottrell’s Blowout
Papadakis perched pond
Inferno Chasm
Grand View crater

Kings Bowl
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?
Overview

Plains-style Volcanism
Lunar Plains-style volcanism
Inferno Chasm Rift Zone
Comparative Planetology
Importance of Stratigraphy
Summary and Future Work
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

Lacus Veris

LROC WAC 100 m/px

Greeley (1976)
Yingst & Head (1997)
Whitten et al. (2011)

LROC WAC (low-sun)

LROC NAC DTM (2m/post)

Elevation (m)
-436
-482
-574
-620
-712
-804
-896

2 km
Southeastern Mare Serenitatis

Mare Serenitatis

A17

Mare Tranquillitatis

LROC WAC Color 64 ppd

Clementine Color-ratio 151 ppd

Head, 1975
Wood, 1979
Weitz & Head, 1999
Southeastern Mare Serenitatis

Geologic Map (Wolfe et al., 1981)
Southeastern Mare Serenitatis

LROC NAC M180987787 (1.3 m/px)

Isis

dome?

cone?

Osiris

1 km
Geologic Context

Craters of the Moon
Cerro Grande
Hell’s Half-Acre
Kings Bowl
Wapi
Comparing the Moon to Earth

Wild Horse Corral vent
Cottrell’s Blowout vent
Papadakis perched pond
Inferno Chasm channel
Grand View crater dome

NAC DTM 3 km
Lunar Rilles

**Isis**

- No visible deposits at end of channel.
- Channel is not carved into the substrate.

**A**

**B**

- Vent Height: 60-85 m
- Channel Width: 200 m
- Channel Depth: 15-30 m
- Channel Length: 3.0 km
- Sinuosity: 1.28 [5]

1 km

2 km
Lunar Rilles

- Vent Height: 60-85 m
- Channel Width: 200 m
- Channel Depth: 15-30 m
- Channel Length: 3.0 km
- Sinuosity: 1.28

Isis A-A'

Isis B-B'

NAC DTM 5 m/post

Elevation (m)

Distance (m)

2 km
Lunar Rilles

Isis

no visible deposits at end of channel

channel is not carved into the substrate

1 km

Inferno Chasm

Channel

Vent

550 m
Lunar Rilles

Isis

no visible deposits at end of channel
channel is not carved into the substrate

Inferno Chasm
Channel
Vent

1 km
550 m
DGPS – Profiles

Inferno Chasm (Idaho)

[Diagram showing elevation profiles and distances marked at various points along the chasm.]
Osiris

LROC NAC DTM

LROC NAC

1 km

FINESS
Flat Topped Dome (?)

LROC NAC DTM

LROC NAC

Dome A-A'

Dome B-B'

NAC DTM 5 m/pixel
Flat Topped Dome (?)

Grand View crater

LROC NAC DTM

GoogleEarth

LROC NAC

1 km

300 m
Vent (?)
Vent (?)
Vent (?)
Lava Pond (?)
Lava Pond (?)
Comparing Earth to the Moon

- Wild Horse Corral
- Cottrell’s Blowout
- Papadakis perched pond
- Inferno Chasm
- Grand View crater

LROC NAC DTM

GoogleEarth

Isis

Osiris

Kings Bowl

3 km
Stratigraphy at Hadley Rille
Details in the Boulders

Irregular Horizons (welded spatter, overflows)

Parallel Vesicle Horizons (Inflation)

Inferno Chasm vent

(Keszthelyi, 2008)
Details in the Boulders

Vent region for Isis

Boulders on rim of vent
Analogs for other lunar features?

- Very different scales
- Very similar morphologies

Greeley & Schultz (1977)
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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