

LER 14-DAY TRAVERSE
BPLF North Side (Day 5)
Crew A
(Modified Following Day 4 Activities)

Primary objective: Compare and contrast the relatively dark albedo (red) layered unit with underlying knobby and relatively light-albedo layered unit; evaluate structural elements.

Station 1: ~~Trace layered unit beneath flow into gully and look for contact with lava flow. Describe and sample any contact zone and bounding lithologies.~~

Survey from LER the relatively dark albedo (red) layered unit and overlying basalt flow from today's Station 1 to the west. EVA only if interesting rock is seen that will augment Day 4's Station 6.

Station 2: Describe and sample basalt flow and underlying layered units

Station 3: Describe and sample layered unit and cross-cutting channel sediments

Station 4: Same as Station 3, although layered bedrock should be more abundant at this station

Station 5: Describe and sample the knobby, relatively bright albedo unit and its stratigraphic relationship to the darker albedo layered unit at the previous station

PUP and garbage operations today

Morning Briefing

Science Briefing and update of the nominal traverse plan, details TBD in real time.

Drive A: Retrace route to the west and approach layered unit beneath flow where sampled at yesterday's Station 6. ~~Trace layered unit into gully, looking for contact with lava flow. Crew chooses best location for stopping vehicle.~~ (17 min)

Crew perspective of geology may be different while traveling west (this morning) compared to their view of it traveling east (late yesterday). Describe any new geological relationships.

(:17)

EV1 & EV2: Egress

Station 1: Evaluate contact zone between base of lava flow and underlying layered units (45 min plus egress and ingress)

Trace layered unit from gully around lobe to the west, looking for good exposures that may augment yesterday's Station 6 activities. Photodocument the layered unit and the overlying lava flow. There is no EVA, unless crew identifies rock that will significantly enhance yesterday's Station 6 activities. ~~Looking for contact with lava flow. Describe lateral variations in the layered unit and the contact zone. Sample the contact zone and bounding lithologies.~~

Characterize layered unit

Describe and sample the layered unit
What are the textures?
Grain size? Heterogeneous? Homogeneous?
Fluvial or eolian features? Volcanic features?

Describe the contact with the base of the lava flow

Describe the basalt

How thick?
Is it internally stratified or massive?
Any phenocrysts or xenoliths?
What are the textural varieties? In vertical profile?
Is the base of the flow visible? Compare to yesterday's Stations 1, 2, & 3.

~~EV1 & EV 2: Ingress~~

(1:27)

Drive B: Continue driving west-southwest along the north margin of the lava flow (26 min).

Describe the margin of the flow.

Describe the debris eroding from the flow. Is it alluvial? Are there rock flow channels? How much water may have been involved?

(1:53)

Station 2: Edge of lava flow (45 min plus time to egress and ingress).

Photogeologic hint of a knob of rock with a slightly lighter albedo than lava, overlying light-albedo material; may be a good cross-section through layered units beneath lava flow and the contact zone.

Characterize layered unit(s)

Describe and sample the layered unit

What are the textures?
Grain size? Heterogeneous? Homogeneous?
Fluvial or eolian features? Volcanic features?

Describe the contact with the base of the lava flow

Describe the basalt

How thick?
Is it internally stratified or massive?
Any phenocrysts or xenoliths?
What are the textural varieties? In vertical profile?
Is the base of the flow visible? Compare to yesterday's Stations 1, 2, & 3.

EV1 & EV 2: Ingress

(3:03)

Drive C: Drive northeast (21 min)

Approximately 600 to 700 m along traverse path, dark albedo material (basalt or basalt sediment) appears to be covering the darker albedo layered unit or debris from that layered unit. Describe the relationship. Does it reflect a primary bedrock relationship or a secondary sedimentological relationship?

**Describe the relatively dark albedo layered unit and cross-cutting channels
Are there both fluvial and eolian features?**

(3:24)

Station 3: Stop in channel sequence between two converging washes (20 min plus egress and re-docking into suit ports)

Characterize converging channel sediments

What type of particle sorting, particle rounding, etc. do sediments have?
Are this immature sediments that are derived entirely from local bedrock?

Collect representative samples of the sediment.

2-3 scoops may be sufficient, but crew can trench if they think appropriate.

Characterize the nature of relatively dark albedo layered unit

Different minerals?
Different grain size?
Aquatically transported? Windblown?
Surface coating only?

Collect 1-2 representative samples of the unit

EV1 & EV2: Re-dock into suit ports and prepare to use aft (exterior) steering controls to reach Station 4.

(4:09)

Drive D: Using aft (exterior) steering controls, drive northeast to Station 4 (13 min)

Continue to describe the relatively dark albedo layered unit and cross-cutting channels

(4:22)

Station 4: Describe and sample layered units in stratified mesa and any nearby bright albedo sediment (20 min plus egress and ingress)

Describe stratigraphy in mesa.

Describe textures of strata and deduce depositional processes; if possible, determine flow direction.

Collect representative samples of the layered units (2-3 samples), preferably in stratigraphic context.

Describe and characterize each sample by grain size, porosity, maturity, and flow features.

Collect 1 sample of any nearby bright albedo sediment (e.g., northwest of mesa knoll)

EV1 & EV2: Ingress or, if crew feels it is feasible, use aft (exterior) steering controls to reach Station 5.

(4:57)

Drive E: Drive northeast (15 minutes)

This drive will take crew from the relatively dark albedo layered unit to the brighter albedo knobby unit. They should describe the stratigraphic relationship.

They should also pause at the boundary between the units and, from inside the LER, describe the contact zone. Is it conformable?

Try to make station on a high point, so that crew can view as far to the east-northeast as possible.

(5:12)

EV1 & EV2: Egress or, if crew used aft (exterior) steering controls to reach Station 5, then un-dock from the suit ports.

Station 5: Describe and sample the knobby, relatively bright albedo unit (30 min plus time to egress/un-dock and ingress).

Depending on the elevation of the station, crew may (or may not) be able to see large geologic bluffs to the east.

While crew is EVA, the operations team should capture a 360 degree GigaPan for overnight evaluation.

Describe the knobby unit.

Does it contain sedimentary feature?

Evaluate any structural elements, like lineations, joints, and/or faults

Collect representative samples of the knobby unit (2-3 samples).

Collect 1 sample of any nearby bright albedo sediment

(6:12)

Drive F: Drive south and locate smoothest path back to camp (24 minutes)

(6:36)

PUP Operations: Deploy/hook-up PUP; EVA to assemble stanchions

Garbage Operations

(8:01)

End-of-day Debriefing: Details TBD in real time, i.e., outstanding issues and potential clarifications, as well as **synthesis** of the back-room's perception(s) re. major geologic findings

End of Day 5