LER 14-DAY TRAVERSE
BPLF North Side (Day 6)
Crew A

Primary objective: Evaluate the margin of the lava flow where it reaches and pours over an anticlinal fold.

Station 1: Describe and sample the knobby, relatively bright albedo unit. Evaluate any structural elements (joints, lineations, faults) that may cross-cut the unit.

Station 2: Describe and sample very bright albedo material within the knobby unit; again, evaluate any structural elements that may cross-cut the knobby unit.

Station 3: Describe the transition between the light albedo knobby unit and the adjacent light albedo layered unit (a new unit). Describe the anticlinal fold. Describe the margin of the lava flow.

Station 4: Describe and sample the a good exposure of the top of the lava flow

Station 5: Provide a perspective of regional geology from the top of the flow; describe and sample the flow in the vicinity of Camp C6

Morning Briefing

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

Drive A: Drive northeast, transitioning from relatively dark albedo layered terrain into the knobby terrain (17 min).

Describe the contact between the two terrains.

Describe any structural elements (joints, etc.) that are visible in surface.

(0:17)

EV1 & EV 2: Egress

Station 1: Describe and sample the knobby, relatively bright albedo unit (25 min plus time to egress/un-dock and ingress).

Is this station up section or down section relative to Station 5 yesterday?

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.

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).

EV1 & EV 2: Ingress

(1:22)

Drive B: Drive south to reach Station 2. Route will carry LER into the head of a drainage system (12 min)

Describe variations in the knobby unit and any other visible material

(1:34)

EV1 & EV 2: Egress

Station 2: Describe and sample the very bright albedo material that forms patches on top of the knobby, relatively bright albedo unit (25 min plus time to egress/un-dock and ingress).

Is this station up section or down section relative to Station 1 today and Station 5 yesterday?

The section seems to be part of a drainage system; has it exposed a different stratigraphic level?

Describe the very bright albedo unit

Is it bedrock or unconsolidated sediment?

Fluvial or eolian features?

Collect representative samples of the very bright albedo unit (2-3 samples).

If the material is sediment, it can either be sampled by scoop of surface material of, at crew discretion, in a trench.

Describe the knobby unit if visible.

Does it contain sedimentary feature?

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

EV1 & EV 2: Ingress

(2:14)

Drive C: Long drive to Station 3. Try to locate relatively smooth driving surface. (42 min)

Towards end of drive, the landscape will dip downward. The goal is to drive into a stratigraphically lower layered unit, safely descend part of the limb of the anticlinal fold, and approach the eastern margin of the lava flow(s).

(2:56)

Station 3: IVA (30 min)

Geology from within the LER and using the cameras mounted on top of the LER, evaluate the terrain. Move the LER as needed.

Describe and image the anticlinal fold to the east-northeast

Describe and image the eastern lobe of the lava flow(s)

Describe and image the northern margin of the lava flow(s)

Describe and image the block of relatively dark albedo layered material along the flow margin.

Is feature a kipuka in the original lava flow?

Did the flow margin collapse due to secondary erosion?

Or is there some other explanation?

Describe the underlying layered unit

Describe additional strata within the layered unit that are exposed in the adjacent ravine

GigaPan: Either crew should capture a full 360 degree GigaPan during IVA or operations staff should capture it during EVA

EV1 & EV2: Egress

Station 3: EVA (45 min plus time to egress and ingress)

Describe the underlying layered units.

Does they contain sedimentary features?

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

Collect representative samples material (4-6 samples).

Be very careful along ravine, but sample different stratigraphic levels if they are exposed and can be safely collected.

EV1 & EV2: Ingress

(4:36)

Drive D: Drive back to towards Camp C4-5 where crew will pick up PUP. Route will roughly retrace that from Station 2. However, if a safe route slightly farther to the west (closer to the lava flow) can be found, that route is preferred. It will provide a closer look at units exposed along the flow margin and ravine. Towards the end of the route, diverge west a short distance to reach Station 4. (41 min)

En route, describe variations in the margin of the lava flow and the underlying layered units that are exposed along the adjacent ravine.

EV1 & EV2: Egress

(5:17)

Station 4: Describe and sample a well-exposed outcrop at the top of the lava flow (30 min plus time for egress and ingress)

NOTE FOR FLIGHT AND SCIENCE CAPCOMS: The crew is being directed to sample the top of the flow. While approaching that station they should discover ventifacts. Please give them time to discover the ventifacts. However, intervene if necessary and DO NOT LET THEM DRIVE THE LER ON THE SURFACE WITH VENTIFACTS. They should park at edge of ventifact field and then walk the rest of the station area.

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 previous stations.

(5:47)

EV1 & EV2: Dock into suit ports and use aft (exterior) steering controls to reach Camp C4-5.

Drive E: Drive to Camp C4-5 (10 min)

(5:57)

Camp C4-5: PUP operations (50 min)

(6:52)

Drive F: Drive from Camp C4-5 to Camp C6. Follow road. (24 min)

(7:16)

Station 5: IVA (up to 15 min if needed)

From the elevated perspective of C6
Describe the margin of the flow
Describe the underlying layered units
Describe any structures that are visible
Use fore camera if necessary.

EV1 & EV2: Egress

Station 5: EVA (20 min plus time to egress and ingress)

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 previous stations.

Collect 2-3 representative samples of the top of the lava flow
Collect 1-2 samples of any overlying sediments

EV1 & EV2: Ingress

(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 6