

from the north, and traverse the ridges to the apparent base of the accumulation zone. Sample the volcanic rock suite and look for diversity and evidence of different eruption styles. Assess wall stratigraphy and gather representative samples in sequence for radiometric dating. (MEPAG investigations IA1, IA2, IA3, IIA2, IIB4, IIB5, IIIA1, IIIA3, IIIA4, IIIA5, IIIA6).

**Shallow Seismic Survey.** Measure thickness of sublimation tills and graben fill deposit at distal and proximal locations; assess presence of ice beneath till on graben floor. (MEPAG investigations IA1, IA2, IIB5, IIIA1, IIIA2).

**Sediment Drilling.** Analyze contributions from Arsia (tephra and bedrock) and from regional climate system (dust and ice) (MEPAG investigations IA1, IA2, IIB5, IIIA1, IIIA2).

**GPR Ice-sounding.** Determine high-resolution layering of valley-fill deposit, and document lenses of near-surface ice. (MEPAG investigations IA1, IA2, IIB5, IIIA1, IIIA2).

**Shallow Excavations.** Sample near-surface ice and permafrost deposits. (MEPAG investigations IA1, IA2, IIB5, IIIA1, IIIA2).

**Electrical Resistivity.** Determine permafrost depth in valley fill deposit and on surrounding plains. (MEPAG investigations IA1, IA2, IIB5, IIIA1, IIIA2).

**Rock Sampling.** Systematic sampling to provide constraints on flow rates and evolution with implications for recent climate change. (MEPAG investigations IA3, IIIA2).

**Mapping.** Features of interest would include accumulation zone at the south-eastern extent of the graben and parallel ridges throughout the graben. Detailed maps of the extent of each of the major drop moraines. (MEPAG investigations IA1, IA2, IIB5, IIIA1, IIIA2).

### 5. Eastern Flank of Arsia Mons — 3 months

**Geological Investigations of the Flank of a Major Shield Volcano on Mars.** Analysis of mineralogy and petrology of lava flows, pyroclastic edifices and tephra deposits. Examine evidence for volcano-ice interactions and document geologic effects and chemical/mineralogic alterations. Look for evidence of the highest topographic levels of ice accumulation on the edifice and document the nature of such deposits. (MEPAG investigations IIIA4). Mapping of the Flanks of a Representative Tharsis Volcano. (MEPAG investigations IA1, IA2, IIB5, IIIA1, IIIA2). Installation of sensitive seismometers to detect current magmatic and deeper subsurface activity and to study the internal structure of the volcanic edifice. (MEPAG investigations IA1, IA2, IIB5, IIIA1, IIIA2).

**Rock Sampling.** Systematic sampling of Amazonian volcanic units to provide insight into present Mars composition. (MEPAG investigations IA3, IIIA2).

### 6. Southern Young Glacial Deposits — 3 months

**Geological Analysis.** Study the nature of the youngest glacial deposits in and around the small graben and assess the drop moraines and their stratigraphic relationships. Assess the ages of these in relation to the rest of the Arsia tropical mountain glacier deposits. Traverse the broad Arsia lava flows that appear to be superposed on the glacial deposit and assess their ages in detail, sampling for radiometric ages. Look for evidence for volcano-ice interactions and document these effects, including generation and fate of any meltwater. Assess impact craters for deeper material and subglacial deposits. (MEPAG investigations IIIA3, IIIA4).

**Shallow Seismic Survey.** Determine relative contributions of glacial and volcanic deposits. (MEPAG investigations IA1, IA2, IIB5, IIIA1, IIIA2).

**Sediment Drilling.** Examine sediment for compositional analysis. (MEPAG investigations IA1, IA2, IIB5, IIIA1, IIIA2).

**GPR Ice-sounding.** Determine high-resolution layering of smooth glacial units, and document lenses of near-surface ice. (MEPAG investigations IA1, IA2, IIB5, IIIA1, IIIA2).

**Shallow Excavations.** Sample near-surface ice and permafrost deposits. (MEPAG investigations IA1, IA2, IIB5, IIIA1, IIIA2).

**Electrical Resistivity.** Determine permafrost depth in young glacial deposits. (MEPAG investigations IA1, IA2, IIB5, IIIA1, IIIA2).

**Ice Coring.** Drill to reveal ice composition and trapped atmosphere for recent climate change analysis.

### 7. Western Deposits — 4 months

**Geologic Analysis.** Traverse to major graben within the fan-shaped tropical mountain glacier deposit. Compare these glacial deposits to relatively younger deposits higher on the edifice. Assess proportions of sediment sources and determine depth to ice.