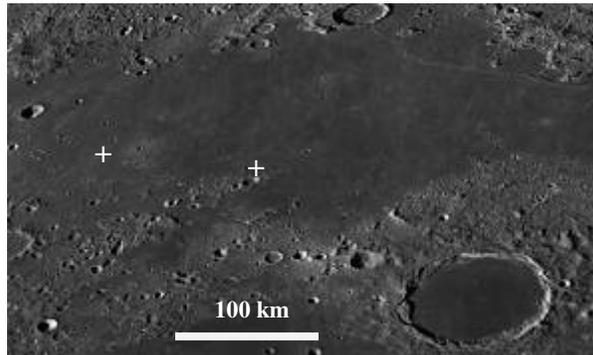


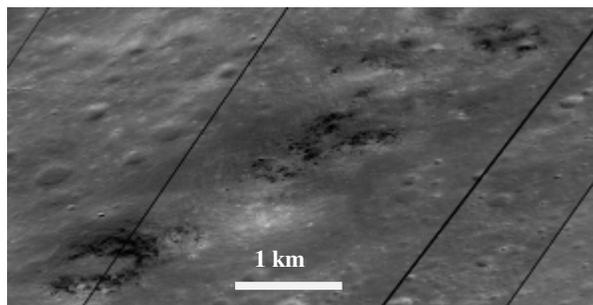
**VOLCANISM WITHIN MARE FRIGORIS: FURTHER EVIDENCE FOR RECENT ERUPTIONS ON THE MOON.** E. F. Albin and R. S. Harris, Department of Space Sciences, Fernbank Science Center, 156 Heaton Park Dr., Atlanta, GA 30307.

**Introduction:** We report on the identification of evidence for possible recent volcanic activity inside the southern margin of Mare Frigoris (Figure 1). Evidence includes two distinct sets of elliptical constructs with associated dark flows – one found at  $57.2^\circ$  N,  $-26.8^\circ$  W and the other centered at  $56.6^\circ$  N,  $-19.7^\circ$  W. They were discovered on narrow-angle Lunar Reconnaissance Orbiter imagery, one situated 25 km east of the La Condmine S crater and the other 13 km north of La Condmine J impact crater. A preliminary description of these features was given by Albin and Harris [1]; however, they are of a somewhat different nature than those described by Braden et al. [2] in that they are associated with distinct constructs.



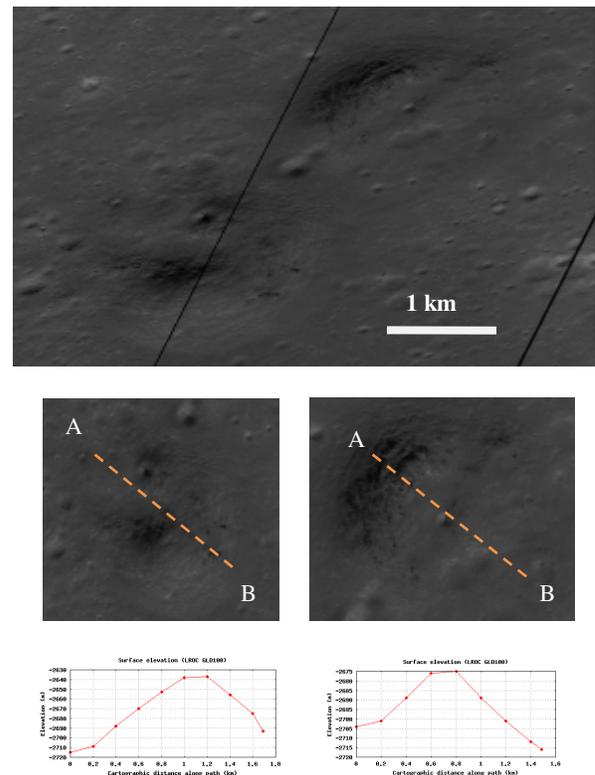
**Figure 1.** Wide-scale view of Mare Frigoris, showing the location of volcanic constructs discussed in text.

**Construct Geomorphology:** The first set of constructs appear along a 7 km ridge, trending southwest to northeast on the mare surface (Figure 2). Three individual structures are present, with diameters ranging between approximately 1.5 and 2 km. Heights of the constructs range between 60 – 70 m, with elevation decreasing toward the northeast.



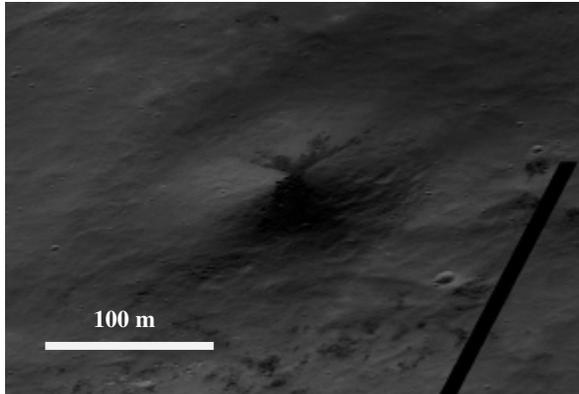
**Figure 2.** Oblique LRO image composite showing a set of constructs trending NW – NE. Note dark colored deposits on flanks.

The second set of constructs consists of a pair of domes that occur along a 3.2 km lineament trending southwest to northeast (Figure 3). The southwestern construct is the largest, measuring approximately 1.4 km in diameter by 65 m in height while the northeastern structure measures 1.2 km wide by 40 m high (Figure 4). Note centrally located summit pits on each structure and dark deposits on flanks.

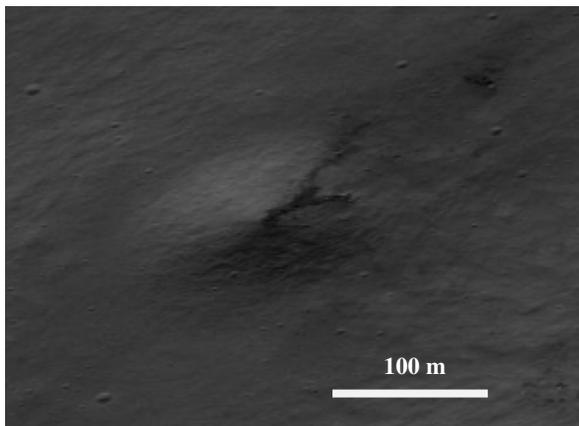


**Figure 3.** Oblique LRO image composite showing a pair of constructs, including associated elevation profiles.

**Summit Pits:** Distinctive summit pits are present on each of the two constructs shown in Figure 3, and they appear to be concave well-defined pits approximately 190 m and 120 m in diameter, respectively (Figures 4 and 5). These pits are each encircled by a deposit of raised material. In addition, dark lobate deposits are found within each of these summit pits. In the northeastern structure, the dark deposit appears to have flowed out of the summit pit.

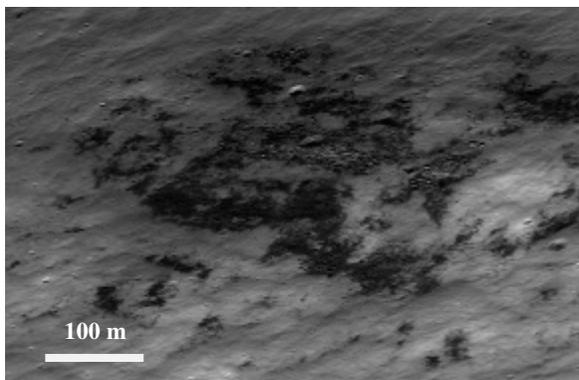


**Figure 4.** Summit pit on SW construct found in Figure 3, showing associated dark deposits.

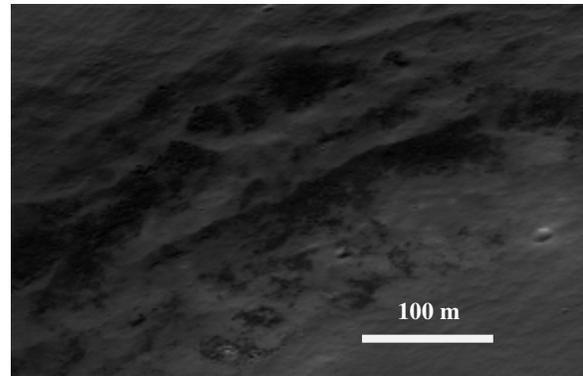


**Figure 5.** Summit pit on NE construct found in Figure 3, showing associated dark deposits, which appear to have flowed over the rim.

**Dark Flows:** Distinct dark deposits, exhibiting flow lobes, emanate from the summit pits. In addition, rubbly, flow-like dark deposits are found sporadically along the flanks of each feature. (Figures 6 and 7) We interpret these structures as low profile steep-sided volcanic domes.



**Figure 6.** Dark deposits on the flanks of the southwestern most construct found in Figure 2. Note the paucity of craters on the dark flow-like material.



**Figure 7.** Dark rubbly deposits on the flanks of the northeastern most construct found in Figure 3.

**Discussion and Conclusions:** Hawke et al. [3] discussed volcanic constructs in the eastern part of Mare Frigoris; however, the features described in this study appear to be significantly younger. The domes may represent upwelling along a localized rift. Continued extension on the flanks appears to have released discrete dark flows. Well-defined flows crossing the floors of summit pits appear to have flowed uphill. We suggest that the evacuation of the magma chambers beneath these flows caused subsidence, forming the pits and giving the illusion that the lava flowed up and over the rims.



**Figure 8.** Possible terrestrial analog -- Pisgah Crater lava flows.

The Pisgah crater volcanic field in southern California may be a good terrestrial analog (Figure 8). Although the age of these lunar constructs and flows is unknown, the paucity of impact craters suggests that they are relatively young. These could represent very recent eruptions of evolved magma on the Moon, similar to those reported by Jolliff et al. [4].

**References:** [1] Albin E. F. and Harris R. S. (2014) *DPS*, 46, 413-09. [2] Braden S. E. et al. (2014) *Nature Geoscience*, 7, 787-791. [3] Hawke B. R. et al. (2014) *LPSC*, 45, 1318. [4] Jolliff et al. (2011) *Nature Geoscience*, 4, 566-571.