

Tephra Layers and Archaeological Sites in the Islands of Four Mountains, Alaska

The Aleutian Islands, Alaska, are located on the boundary of the Pacific Ocean and the Bering Sea (Fig. 1). For nearly 9000 years Aleutian peoples built villages and prospered in this archipelago. By identifying, dating, and tracing tephra layers across the landscape and in various cultural locations we can (1) correlate the time frames of village occupations on different islands and (2) understand how volcanic activity could have impacted people and the ecosystem on local and regional scales.

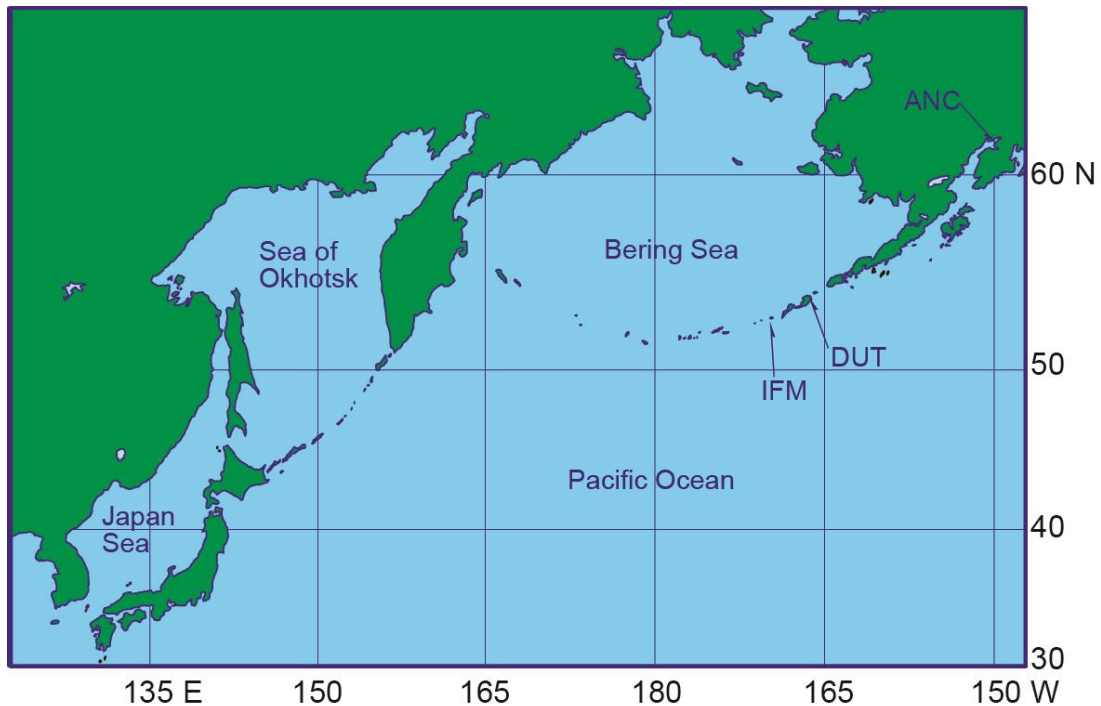


Figure 1. Index map of the Islands of Four Mountains (IFM), Aleutian Islands.
DUT: Dutch Harbor, ANC: Anchorage.

The 2014-2015 field expeditions to the Four Mountains involved flying to Anchorage and on to Dutch Harbor (i.e. Unalaska) in the eastern Aleutians (Fig. 1). From Dutch Harbor we were transported to the IFM via the research vessel *Maritime Maid* (Fig. 2). Our research focused on three of the seven volcanic islands that comprise the IFM:

Herbert, Carlisle, and Chuginadak (Figs. 2-6). Herbert and Carlisle represent single volcanoes; Chuginadak comprises two volcanic cones—Tana and Cleveland—that have coalesced, forming an isthmus.

The Aleutians are cool to cold and support grass and forb vegetation generally described as “tundra.” During the last 10,000 years (aka Holocene) soil and tephra complexes have been deposited on the islands. Among them, we identified a particularly distinctive and coarse grained tephra at an outcrop near prehistoric village site CR-02 on Carlisle Island (Fig. 7). We also observed this CR-02 Tephra sandwiched between cultural layers in housepits at the CR-02 village. In Figure 8 Cultural Layer 2 lies immediately above the CR-02 Tephra. This evidence strongly suggests that prehistoric humans almost immediately returned to their village following this particular volcanic eruption.



Figure 2. Research vessel *Maritime Maid*, which was equipped with a helicopter. Background is Carlisle volcano (July 28, 2014).

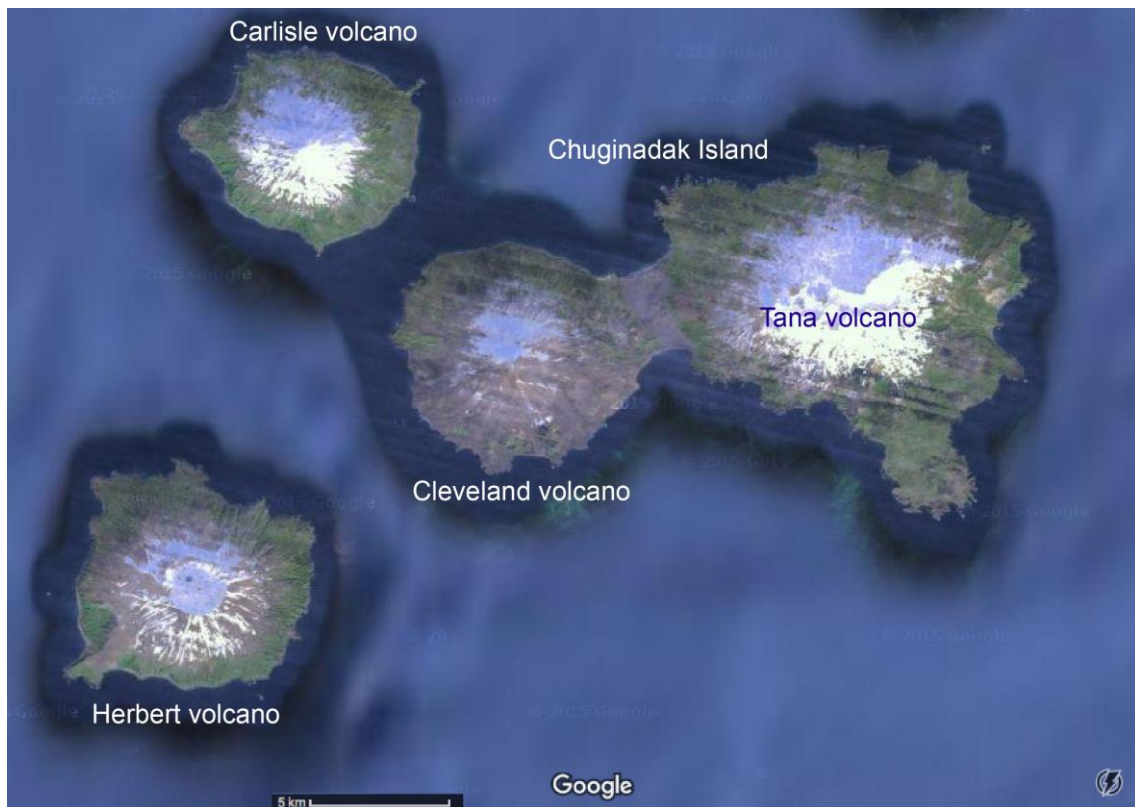


Figure 3. The Islands of Four Mountains (after, Google Map).



Figure 4. Cleveland volcano (front) and Carlisle volcano (background) viewed from the southwest. A steam plume can be observed from the summit of the Cleveland volcano (August 2, 2015).



Figure 5. Herbert volcano viewed from the northern foot (July 26, 2015).



Figure 6. Tana volcano (background) and scoria cones (front) viewed from the west (July 27, 2015). Scoria cones are aligned from the western foot of Tana to Cleveland.



Figure 7. Soil and tephra complex exposed along the sea cliff at the southeastern foot of Carlisle volcano (July 31, 2015). The CR-02 Tephra is located near the top.



Figure 8. Photograph showing occurrence of the CR-02 Tephra sandwiched with the cultural layers in the CR-02 Site, southeastern foot of Carlisle volcano (August 14, 2014).

Acknowledgements:

This field survey was supported by grants for Co-PI's Dixie West, Virginia Hatfield, Kirsten Nicolaysen, and Breanyn MacInnes from the National Science Foundation Office of Polar Programs (OPP#1301927, OPP#1301925, and OPP#1301929), with support from the Keck Geology Consortium (REU#1358987), the U.S. Geological Survey, the Alaska Volcano Observatory, the U.S. Fish and Wildlife Services, the Alaska Maritime National Refuge, the Aleut Corporation, and the Museum of the Aleutians.