

Monitoring the Augustine Volcano

Jeff Freymueller » Geophysical Institute, University of Alaska Fairbanks

Peter Cervelli » U.S. Geological Survey, Alaska Volcano Observatory

After months of increasing unrest and precursory deformation, Augustine volcano began to experience small explosions in mid-December 2005. Although there were five Plate Boundary Observatory (PBO) continuous GPS sites on the island, the PBO network was concentrated near the summit and upper flanks of the volcano. These locations made the network very sensitive to shallow deformation source, but the lack of stations farther from the summit limited the resolution of deeper source. In December, Alaska Volcano Observatory made the decision to install several temporary continuous sites on the island. We were constrained by winter weather and lack of daylight, and by safety concerns, so a full-blown PBO-style installation was impossible. We sought an alternative that would allow a quick installation, and found the answer in the UNAVCO web pages. We borrowed Tech-2000 antenna masts from UNAVCO (Figure 1), and had our machine shop make up additional simplified antenna masts based on the same

design. These antenna masts allowed a complete site to be set up in about an hour, and we set up 5 sites around the lower flanks of the volcano, recording locally and using only battery power. A sixth planned site could not be installed due to bad weather. Moving quickly was critical—soon after our installations it became too unsafe to work on the island. At the three sites where bedrock was available to anchor the chains, the masts were stable over a period of several months, and provided useful data constraining the deeper deflationary source observed in the eruption.

Figure 1. University of Alaska Fairbanks student Tom Fournier sets up a temporary continuous site on the south flank of Augustine volcano, using a borrowed UNAVCO Tech-2000 mast.

Figure 2. Site AUGB on the north coast of Augustine Island moved abruptly to the south during the eruption, around 2006.1. Data from this and other sites are consistent with a deep (mid-crustal) deflation source.

