

The SD Mines GEOL/GEOE/PALEO Seminar Series

presents

Gravity/surface deformation (geodesy) research at Pacaya, St. Helens, and Kilauea

Dr. Albert Eggers, University of Puget Sound (emeritus)

Measuring and mapping microgravity and contemporaneous surface deformation changes at Volcán de Pacaya in Guatemala during the 1970's by Eggers and students showed the utility of using such techniques in analyzing the nature and movements of shallow magma bodies within volcanoes. Despite logistical limitations, additional work on Mt. St Helens revealed short-term (min to hr) dry-tilt events (10's of mrad) and small gravity changes (tens of μgals) concurrent with seismic and eruptive events in the months directly prior to the May 18, 1980 eruption. Additional microgravity change mapping and surface deformation measurements at Kilauea (1976-2008) identified a growing residual gravity change anomaly centered on the east rim of Halemaumau crater. This anomaly was produced by a shallow (~1-3 km deep) active magma body growing at a rate of $\sim 2 \times 10^9$ kg/yr adding $\sim 27 \times 10^6$ m³ of magma to the shallow chamber from 1976 to 2003. Continued measurements through 2008 confirmed these observations. In 2018 the area of the anomaly collapsed, enlarging the crater by about 900×10^6 m³.



Mt St Helens, 1980



Dan Johnson, Halemaumau, Kilauea

In 1970 the University of Puget Sound Geology Department expanded to three faculty with the addition of Albert Eggers, a volcanologist from Dartmouth. Al assumed responsibility for the mineralogy / petrology courses and expanded the analytical facilities in the department by setting up an XRF/XDR laboratory. By this time undergraduate research was becoming a more prominent part of the curriculum, and during his 30+ years at Puget Sound Al involved numerous geology majors in his work in Central America and at Mt. St. Helens. Al retired in 2001 but has continued his studies into surface deformation and gravity variations at active volcanoes.

4:00 p.m. MDT, Friday, Feb 19, 2021

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