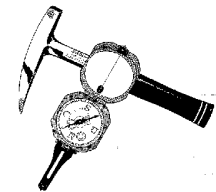


California State University
Northridge



The Department of Geological Sciences Presents:

Jorge Vazquez

USGS

**Voluminous Pliocene eruptions from
northern California volcanoes and
their ash-bed archive in marine
sediments**

Tuesday, Dec. 5th, at 12:30 p.m. in LO1212

Please call (818) 677-3541 or email geology@csun.edu if you have any questions

Abstract:

During the Pliocene Epoch, explosive eruptions of silicic magma from volcanoes of the ancestral Cascades arc and Sonoma volcanic field produced regionally extensive ash beds. In northern California, these ash beds are well preserved in shallow marine deposits including the late Miocene–Pliocene Purisima Formation. The Purisima Formation, exposed locally from Point Reyes to Santa Cruz, records nearshore to shelfal sedimentation in the vicinity of the San Andreas and San Gregorio Faults and is famous for its diverse marine fossils. To date deposition of the Purisima Formation, place a high-fidelity timeline on its fossil record, and resolve the record of large explosive volcanic eruptions during this time, unpolished rim surfaces of single zircons from Purisima ash beds were dated by high-spatial resolution U-Pb geochronology. These analyses discriminated detrital zircons from a youngest age population interpreted to reflect the nearest-eruption crystallization of juvenile crystals. The stratigraphically oldest ash bed, located ~30 m above the formation's unconformable base yields a $^{206}\text{Pb}/^{238}\text{U}$ date of ~6.3 Ma consistent with its magnetostratigraphy and associated diatom biozone. The two stratigraphically youngest ash beds in the section at San Gregorio State Beach yield indistinguishable dates of ~3.0 Ma; one of these beds was geochemically correlated by past workers to the Ishi Tuff exposed in the Sacramento Valley and erupted from the southern Cascades arc. Based on the Pb/U dates and stratigraphic relations, the results indicate a depositional rate of ~170m/Myr in the shelf paleoenvironment. Homogenous concentrations of trace elements including rare-earth-elements in glass shards indicate the dated ash beds are the products of single volcanic eruptions despite detrital input and field evidence for reworking. Based on geochemistry, the ash beds can be mostly separated into two groups consistent with volcanic sources in the Cascades arc and Sonoma volcanic field. Considered with the zircon geochronology and Mio-Pliocene position of the Purisima basin, these ash beds primarily reflect material from silicic eruptions around the Lassen volcanic center and the Mount Saint Helena caldera center of the Sonoma volcanic field. The age and shard composition of one ash bed indicates a source in the Heise caldera complex of the Yellowstone hotspot.