J161-003 **Room: 301B** **Time: May 14 9:30-9:45**

Spatial and temporal fluctuation of Hawaiian hotspot activity: What causes the rejuvenated volcanism?

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Many mantle plume volcanoes undergo rejuvenated volcanism after a period of construction and erosion of their shield. The cause of this renewed volcanism has been enigmatic, and various models have been proposed. However, the lack of chronological data has hindered evaluating these models. Here we summarize below our recent results of unspiked K-Ar dating on rejuvenated lavas from five Hawaiian volcanoes. These ages, coupled with other geological and geophysical constraints, will be used to test the models.

(1) Haleakala (East Maui) (Sherrod et al., 2003): The postshield and previously inferred rejuvenated-stage history was reevaluated using 52 new ages. Periods of low extrusion rates or volcanic quiescence occurred at ˜0.76 - 0.65 Ma and ˜0.45 - 0.29 Ma, both within the postshield Kula unit. The volcanic quiescence between postshield and supposed rejuvenated-stage units is about 0.03 m.y., much shorter than the previously estimated period of 0.25 - 0.30 m.y.

(2) West Maui (Tagami et al., 2003; Sherrod et al., in prep.): Rejuvenated-stage Lahaina Volcanics were erupted from only four sites and their new ages indicate two volcanic pulses at about 0.6 and 0.4 Ma. Nine ages for the underlying postshield and 28 for shield stage units range from 1.8 - 1.3 Ma and 1.3 - 1.2 Ma, respectively. Therefore, the duration of volcanic quiescence prior to rejuvenation is about 0.6 m.y. at West Maui, much longer than estimated previously.

(3) Koolau, Oahu (Ozawa et al., 2005): New ages on 41 samples from 32 vents of rejuvenated-stage Honolulu Volcanics and on eight samples of underlying shield-stage Koolau Volcanics show that shield volcanism ended at 2.1 Ma and that rejuvenated volcanism started at 0.8 Ma, resulting in a 1.3 m.y. hiatus in volcanic activity. Two distinct pulses were found for Honolulu volcanism at 0.8 - 0.35 and ˜0.1 Ma. During the first pulse, the eruption frequency increased with time and there was no obvious spatial pattern in vent distribution. Volcanism apparently waned from 0.35 - 0.12 Ma, with only one eruption. The second pulse occurred along two rifts that trend N-S and NE-SW with distinct compositions: weakly alkalic and melilite nephelinite.

(4) Kahoolawe (Sano et al., in press): youngest eruptions left five small deposits of dike-fed cinders and sparse lava flows, which were previously undated but thought part of a rejuvenated stage on the basis of a substantial erosional unconformity. Two samples from the southernmost site and one sample from the next site northward show ages of 1.0 to 1.4 Ma. Seven previously published ages and one new age from shield and postshield lava flows ranges from about 1.4 to 1.0 Ma. These data indicate a short gap between the postshield and youngest eruptions.

(5) Kauai (Sano et al., this meeting): New ages of 23 samples from rejuvenated Koloa Volcanics range from 0.15 to 3.9 Ma, whereas ages of five samples from late shield-stage Waimea Canyon Basalt are 4.1-4.5 Ma. The length of volcanic quiescence before rejuvenation is 1.1 m.y., ranging from about 3.6 to 2.5 Ma.

References

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