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# Geomagnetic Field Inclinations for a 350 kyr Time gap From the 350 m Core of the Kalihi Scientific Drilling Project Recovered From the Ko'olau Volcano, O'ahu, Hawai'i.

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In order to investigate the volcanic evolution of the Koolau Volcano, O'ahu Hawai'i and the geomagnetic field behavior recorded by the lavas, a paleomagnetic and rock magnetic study was conducted on a 350m thick sequence of flows from the Kalihi Scientific Drilling Project. This drill core records geomagnetic field inclination for the period of approximately 2.75 to 3.1 Ma. The core extends deeper stratigraphically any surface exposures of the volcano and the rocks obtained have experienced less tropical weathering than surface rocks. Previous published work on Ko'olau has indicated that the volcano was formed during the Matuyama Chron (Doell and Dalrymple, 1973).

We drilled multiple one-inch long samples from each of the 103 flows in the drill core section. The paleomagnetic results of all the specimens were stepwise demagnetized by alternating fields from 5 to 100 mT. Companion specimens from the same core were demagnetized at 15 temperature steps. In both cases demagnetization diagrams obtained with each technique showed a stable and unambiguous characteristic direction of remanence (ChRM). The ChRM was calculated using principal component analysis for the demagnetization diagrams with a well-defined component trending towards the origin. No bias or systematic departure from the origin was accepted and in all cases the ChRM relies on a minimum of seven successive directions isolated during stepwise demagnetization. In addition, low-field susceptibility versus temperature (k-T) and SIRM experiments were performed on a dozen flows at different levels of the core. As a result of such tests, we were able to identify magnetite (575 degrees C) and in few instances a low-temperature mineral phase (300-400 degrees C), reflecting the presence of titanomagnetite with low Ti content as suggested by its large susceptibility. Also, bulk susceptibility (X) measurements were performed on all flows indicating that very few variations existed attesting to a generally uniform lithology derived from its magnetic mineralogy. The analysis reveals two instances of near-zero and two instances of low negative inclination (reversed polarity) within an otherwise normal polarity. In particular, flow units 34 to 50 record a horizontal inclination and may be associated with the top of the Kaena Subchron. This interpretation is supported also by two Ar-Ar age determinations obtained for flow 14 (2.89 +/- 0.12Ma) and flow 66, (3.06+/-0.15 Ma old), subaerial lavas at several localities where the Reunion II Subchron (ca 2.11 to 2.15 Ma) is recorded and previous results reported by Herrero-Bervera et al (2002) . Our findings lead us to conclude that the growth of the Koolau volcano was concomitant with respect to the youngest exposed lavas of the Wai'anae Volcano and both were forming during the Kaena Subchron.