



DIKE EMPLACEMENT AND THE BIRTH OF THE YELLOWSTONE HOTSPOT, WESTERN USA

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The birth of the Yellowstone hotspot in middle Miocene time was marked by extensive flood basalt volcanism. Prominent aeromagnetic anomalies (referred to collectively as the Northern Nevada rifts), extending hundreds of kilometers across Nevada, are thought to represent dike swarms injected at the time of flood volcanism. Until now, however, dikes from only one of these anomalies (eastern) have been documented, sampled, and dated ($40\text{Ar}/39\text{Ar}$ ages range from 15.4 ± 0.2 to $16.7 \pm 0.5\text{Ma}$; John et al., 2000, ages recalculated using the FCS standard age of $28.02 \pm 0.28\text{Ma}$). We present new paleomagnetic data and an $40\text{Ar}/39\text{Ar}$ age of $16.6 \pm 0.3\text{Ma}$ for a mafic dike suggesting that all the anomalies likely originate from the same mid-Miocene fracturing event.

The magnetic anomalies, together with the trends of dike swarms, faults, and fold axes produce a radiating pattern that converges on a point near the Oregon-Idaho boarder. We speculate that this pattern formed by stresses imposed by the impact of the Yellowstone hotspot.

Glen and Ponce (2002) propose a simple stress model to account for this fracture pattern that consists of a point source of stress at the base of the crust and a regional stress field aligned with the presumed middle Miocene stress direction. Overlapping point and regional stresses result in stress trajectories that form a radiating pattern near the point source (i.e., hotspot). Far from the influence of the point stress, however, stress trajectories verge towards the NNW-trending regional stress direction

(i.e., plate boundary stresses), similar to the pattern of dike swarm traces.

Glen and Ponce, 2002, *Geology*, 30, 7, 647-650

John et al., 2000, *Geol. Soc. Nev. Sym. Proc.*, May 15-18, 2000, 127-154