

# Age-progressive volcanism of the Oregon High Lava Plains: Overview and evaluation of tectonic models

**Brennan T. Jordan**

*Department of Geosciences, Oregon State University, Corvallis, Oregon 97331, USA*

## **ABSTRACT**

The High Lava Plains province of central and southeastern Oregon is a Late Tertiary to Quaternary bimodal volcanic province characterized by age-progressive rhyolites and widespread basaltic volcanism. The age-progressive trend co-originates with the Yellowstone–Snake River Plain trend along the axis of middle Miocene flood basalt vents of the Columbia River and the Steens basalts. Although the Yellowstone trend has an azimuth consistent with plate motion, the High Lava Plains trend is at  $\sim 120^\circ$  off of this direction. This relationship complicates the mantle plume model for the origin of the Yellowstone melting anomaly. Many models have been proposed for the origin of the High Lava Plains, mostly linking the province to the Yellowstone system. I summarize the geology of the High Lava Plains, review models for the origin of the province, evaluate several fundamental aspects of these models, and present my current view of the origin of the High Lava Plains. My analysis disproves the propagating fault zone model for age-progressive volcanism and suggests a role for the westward sublithospheric flow of material from under the craton. I conclude that rather than disproving the plume model for the Yellowstone system, the High Lava Plains may be best understood in the context of plume-related processes.