

Late Quaternary constructional development of the Axial Volcanic Zone, eastern Snake River Plain, Idaho

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The axial volcanic zone (AVZ) is a subdued volcanic ridge that trends northeast across the middle of the eastern Snake River Plain, and acts as a drainage divide that separates the Snake River watershed to the southeast from the Big Lost watershed to the northwest. To investigate the age of the initial AVZ formation, and whether the AVZ is solely a volcanic construct or formed in part due to differential subsidence of adjacent area, 16 subsurface basalt supergroups emplaced between ~626 ka and 221 ka were analyzed across three geographic regions of the eastern Snake River Plain: the AVZ, the Big Lost Trough to the north, and the Arco-Big Southern Butte (ABSB) volcanic rift zone to the northwest. Isopach maps of these lava supergroups were constructed and used to locate proximal (vent) facies, marked by abrupt and significant increases in supergroup thickness. Structural contour maps were made and used to identify regions where vent facies are lower in elevation than distal facies.

Surgroups emplaced at ~626 ka, 567 ka, and 515 ka have vents located in the BLT, and AVZ, yet these rocks are as much as 200 m lower in the vent region than they are in the ABSB, evidence that the BLT and AVZ have uniformly subsided with respect to the ABSB. No differential subsidence between the BLT and AVZ is evident, based on elevations which gently decrease southward toward the AVZ. Surgroups emplaced at ~626 ka and 567 ka flowed south without disruption from the BLT into the ACZ, but overlying supergroups emplaced from 515 to 247 ka commonly exhibit a ponded morphology along a construct between 567 and 515 ka. Since ~247 ka, as many as 13 eruptions have emanated from the AVZ, the elevated topography of which appears to be entirely the result of volcanic construction and not differential subsidence of the AVZ to the north.