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THE RUNNING SPRINGS GEOTHERMAL SYSTEM, SOUTHERN BITTERROOT LOBE, IDAHO
BATHOLITH

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The Running Springs geothermal system consists of two major (>100 l/min) and three minor (<20 l/min) vents in the drainage of Running Creek, a tributary of the Selway River, approximately 25 miles east of Elk City, Idaho. Intrusion of Cretaceous quartz-monzonites and Tertiary granites was followed by a complex sequence of strike-slip and normal faulting, overlapping in time with the intrusion of rhyodacite and rhyolite dikes. The area appears to have been affected by several different stress patterns.

The location of thermal spring vents is controlled by the preferential development of permeability in the rhyodacite dikes due to fracturing during thermal contraction and possibly to displacements at fracture deflections across the margins of dikes or at intersecting fractures. One spring not associated with a rhyodacite dike is developed in a high permeability zone at the intersection of two faults. Permeability differences were enhanced by solution enlargement and filling of fractures with secondary minerals. Geochemical thermometry indicates a maximum source temperature of about 80°C which suggests a depth of circulation of 1-2 km (geothermal gradient, -40°C/km).

In the Running Springs area meteoric water descends through a fracture system, is heated along a normal geothermal gradient and ascends through the same network. Where permeability is higher (rhyodacite dikes) water ascends rapidly retaining properties acquired at depth. Solution and precipitation of minerals enhanced the initial flow differences, sealing all but the most rapidly ascending plumes which resulted in a restricted spring system overlying a reservoir of circulating water.