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**Sinter Aging and Radiocarbon Dating of Hot Spring Deposits in Dixie Valley, Nevada: Dating Normal Faults in Geothermal Areas of the Great Basin**

Dixie Valley in west-central Nevada hosts a high temperature (240°C), deep-circulation, fault-related geothermal system. Fossil thermal spring deposits (travertine and siliceous sinter) occur along the Dixie Valley normal fault near the producing (62 MWe) geothermal field. Radiocarbon dates for pollen and other organic material in the sinter reveal that the youngest deposits are 3.4 ka to essentially modern. The sinter mineralogy and texture is related to their age. Modern-age "geyserite" is composed of juvenile amorphous opal (opal-A), whereas slightly older (2.2 to 3.4 ka) sinters are admixtures of more crystalline cristobalite (opal-C and opal-CT) and microcrystalline quartz. Early surficial discharges of the geothermal system may be represented as clasts of quartz-rich sinter in diatomite associated with pluvial Lake Dixie (11-12 ka).

Paleoseismic studies provide evidence for the timing of large magnitude earthquakes in the Dixie Valley region that may be related to the episodic hot spring activity. Surface-rupturing Pleistocene and Holocene earthquakes include The Gap event (3.7-2.2 ka), an event along the west side of the Stillwater Range (<5.6 ka), and a late Pleistocene event (~ 12-34 ka) in the area of the 1954 Dixie Valley rupture. Discharge of fluids from the deep (2-3 km) geothermal reservoir as hot springs at the surface may be the result of fracturing of silica seals along the top of the fault system, and near the endpoints of fault ruptures where stress changes induce fracturing without inhibiting hydraulic conductivity. Radiocarbon dating of these short-lived hot spring deposits provide important age constraints for the age of faulting in Dixie Valley. Mineralogical and radiometric analyses of thermal spring deposits may be useful for dating faults in other geothermal areas of the Great Basin, such as the Roosevelt and Meadow-Hatton areas in Utah, or the Brady's-Desert Peak, Steamboat, and Beowawe areas in Nevada.