

*δD VALUES OF FLUID INCLUSION WATER IN QUARTZ AND CALCITE EJECTA FROM
ACTIVE GEOTHERMAL SYSTEMS: DO VALUES REFLECT THOSE OF ORIGINAL HYDROTHERMAL WATER?*

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Abstract

One of the most common methods for estimating paleohydrothermal δD values in epithermal quartz veins is hydrogen isotope analysis of H_2O extracted from fluid inclusions in quartz by thermal decrepitation. The validity of the method is questioned. The δD values of water extracted from fluid inclusions in clear euhedral quartz from active geothermal systems are up to 30 per mil more negative than the δD value (-42‰) of the geothermal water. Measured δD values of the fluid inclusion water are dependent on the temperature at which the water in the quartz was extracted. Water extracted at 800°C has δD values about 10 to 15 per mil lower than fluid inclusion water extracted at 500°C (-53 to -61‰). Fluid inclusion water in calcite from an active geothermal well has δD values that match those of the geothermal water. Calcite is thus potentially a more suitable mineral for estimating paleohydrothermal δD values.

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