

FLUID INCLUSION EVIDENCE FOR THE NATURE OF FLUIDS ASSOCIATED
WITH RECRYSTALLIZATION OF QUARTZITES IN THE THE EJB CONTACT
AUREOLE, CALIFORNIA

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ABSTRACT

The purpose of this study was to look at the control of fluids and fluid composition on recrystallization of quartzites in the Eureka Valley–Joshua Flat–Beer Creek pluton contact aureole (EJB), in the White–Inyo Mountains of eastern California. The aureole shows varying degrees of recrystallization and deformation. Fluid inclusions were analyzed by microthermometry, laser ablation–inductively coupled plasma–mass spectrometry, and Raman spectroscopy, to define the compositions of fluids that were responsible for the contrasting styles of deformation and recrystallization.

The inclusions were grouped into three types based on composition: Type I inclusions are strictly aqueous inclusions with various salts. Type II inclusions are mixed aqueous–carbonic inclusions with an aqueous liquid phase and a vapor bubble with a double meniscus of CO₂ fluid and vapor. Type III inclusions have an aqueous–hydrogen sulfide liquid and a single-phase CO₂–CH₄ vapor. Isochores were developed using LA–ICP–MS and microthermometry data to determine the trapping environment of the inclusions. The isochores show an extensive range of P–T conditions of trapping for all types of inclusions, indicating that the P–T history of the EJB aureole is complex, and that all inclusions appear to have undergone the same complicated history.

This study suggests that the fluids trapped in the EJB aureole quartzites are metamorphic from the Antler orogeny. Fluid composition has played a role in the recrystallization history of this quartzite. It is also probable that the pattern of recrystallization seen in the EJB aureole has strongly been influenced by the amount of strain taken up by the Mule Spring unit, allowing the inner aureole to be unaffected by the pluton intrusion. The higher Ca concentrations in fluids in the inner aureole may also have retarded recrystallization of quartzite in the inner aureole.