Stable Isotope Investigation of Water Sources for Forest Vegetation on Thin Soils over Weathered Bedrock. (S07rose181722-Oral)

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Abstract:

Stable isotopes were used to evaluate water sources for Jeffrey pine and greenleaf manzanita in the southern Sierra Nevada, California, where soils were thin but underlain by a thick zone of weathered granitic bedrock. Plant stem tissue, soils, and underlying weathered bedrock were sampled over the 1997 and 1998 growing seasons. Extracted water from the soil/bedrock substrate and plant tissue was analyzed for delta-18O and/or delta-D, and depth of water source was determined by inference in conjunction with moisture status of the substrate. Early season water use was predominantly from surface soils; but progressively deeper water sources, including weathered bedrock, were exploited as moisture was depleted from the overlying substrate. In early-season, slightly lower isotope values were observed for pine compared to manzanita, suggesting the functional rooting depth for pine may have been slightly greater. Unlike pine, manzanita opportunistically utilized the summer precipitation of 1997. In 1998, pine and manzanita delta-D values were not significantly different in mid- and lategrowing season, with both plants exploiting bedrock-derived water as soil water was depleted.

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