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ABSTRACT

Two ring-width chronologies from Douglas fir (*Pseudotsuga menzeisii*) and one from pinyon pine (*Pinus edulis*) were used to reconstruct mean annual discharge of Ashley Creek in the Uinta Mountains, Utah, for the years A.D. 1637 to 1970. A backward-elimination multiple linear-regression model identified six statistically significant variables, including annual lags ranging from –1 to +2 years. The final modeled explains 71 % of variability (R^2 adjusted for degrees of freedom lost) when regressed against the annual discharges recorded for 1915 to 1972. Statistical analysis of the model reconstruction using the reduction-of-error statistic, the Durbin-Watson statistic, and the hypergeometric distribution all indicate fidelity of the model for reconstructing discharge. The Lilliefors' test indicates that years of extreme discharge (greater than the 90^{th} percentile or less than the 10^{th} percentile) are non-randomly distributed between 1637 and 1970. Persistent years of above median discharge as well as non-random clustering of years above the 90^{th} percentile occurred from 1692 to 1704 and from 1898 to 1945. Analysis of the modern gage dataset shows that mean annual discharge on Ashley Creek explains between 81 and 91 % of the variations of mean annual discharge on the other main stream in the southern Uinta Mountains, indicating that reconstructed mean annual discharge on Ashley Creek is representative of paleohydrologic conditions across the south flank of the range. These data suggest that the southern Uinta Mountains experienced persistent below median discharge from 1741 to 1897, through the peak of the Little Ice Age as identified in numerous surrounding mountain ranges in the Central Rockies. This interpretation agrees with lichenometric evidence for extremely limited LIA glacial activity in the Uintas, indicating that the range experienced unusually warm/dry conditions at this time.