Climate Variability and Flood Frequency
at Decadal to Millennial Time Scales

Kelly T. Redmond

Desert Research Institute, Reno, Nevada

Yehouda Enzel

Hebrew University of Jerusalem, Jerusalem, Israel,

P. Kyle House

Nevada Bureau of Mines and Geology, Reno, Nevada

Franco Biondi

Department of Geography, University of Nevada, Reno, Nevada

The climate research community has generally accepted the notion of the climate system as an entity that routinely produces nonstationary time series. Because there is an intimate tie between climate and weather, and between weather and floods, it should not be surprising to encounter nonstationary flood series with some regularity. There is an increasingly large body of paleohydrology and paleoclimate data that offers significant promise in better understanding of the climate system and how it varies over time scales formerly inaccessible to close analysis. The same information can provide insights into ways to place contemporary systematic total and peak streamflow measurements into longer time contexts spanning centuries or more. Most observations and the majority of studies to date have concentrated on arid and semi-arid regions, where confounding influences are minimized and interpretations pertaining to the use of paleo data are cleaner. Building from prior studies this work furnishes further examples utilizing additional paleo data from the southwest United States. El Nino/La Nina connections to climate in this region and elsewhere have received intense scrutiny. For that reason ENSO is used as one example mechanism (although there are certainly others) to illustrate how climate variability can lead to lead to flood variability on a variety of time scales of interest to flood frequency analysts. Flood frequency analysis is essentially an exercise in forecasting, and the quality of the forecast is influenced considerably by the degree to which all scales of the flood-producing system are understood. There are, however, logistical barriers and limitations in using paleo data, and care is required in selecting appropriate records for the application at hand..