

If you think the current drought is bad - try 500 years

Ethan Hawkes, Orange County Register, 10-7-14

Matthew E. Kirby has been digging up 3,000 years' worth of rainfall records and discovered California isn't a stranger to extreme droughts.

During his research, Kirby, associate professor of geological sciences, found evidence in the sediment of Zaca Lake that California has endured periods of multicentury droughts, the longest of which lasted 500 years.

Before this evidence, scientists thought the longest droughts lasted up to 30 years.

"Our research indicates that climate can change and that change can persist for much longer than previously thought," Kirby said.

The 500-year drought in Southern California occurred 2,000 to 2,500 years ago, according to Kirby's research. A majority of the data was gathered from the chemical and physical characteristics of the sediment at the bottom of Zaca Lake, northwest of Santa Barbara.

Tree rings usually are used to determine the history of a climate. They are considered the most accurate way to gather climate data. But they're reliable only when looking back about 1,500 years.

Kirby also found evidence from his studies in Lake Elsinore and Lower Bear River Reservoir that lines up with his findings in Zaca Lake.

"Climate is complex and it does not change necessarily uniformly over space or time. As a result, it is critical for paleo-climatologists to examine multiple sites to really determine the timing and spatial extent of past drought," Kirby said.

The research, funded by the National Science Foundation, also compared the sediment findings with El Niño conditions and found a direct connection between El Niño and precipitation in Southern California.

El Niño is the fluctuation of conditions in the tropical Pacific Ocean, which causes warmer-than-average sea-surface temperatures, and therefore, warmer temperatures globally.

"From this, we infer that El Niño's strength and frequency are the predominant controls on how wet the winter season gets in Southern California over the past 3,000 years," Kirby said.

This is the first time the relationship between El Niño and Southern California climates has been studied back 3,000 years, Kirby said.

The study also shows that any changes to the Pacific Ocean caused by global warming are likely to have an effect on how much water is available, Kirby said.

It's important to note these multicentury droughts do not necessarily mean no rainfall, but it does mean a shift to less rainfall throughout the year, he said.

Kirby is now gathering rainfall data from Crystal Lake in the San Gabriel Mountains.