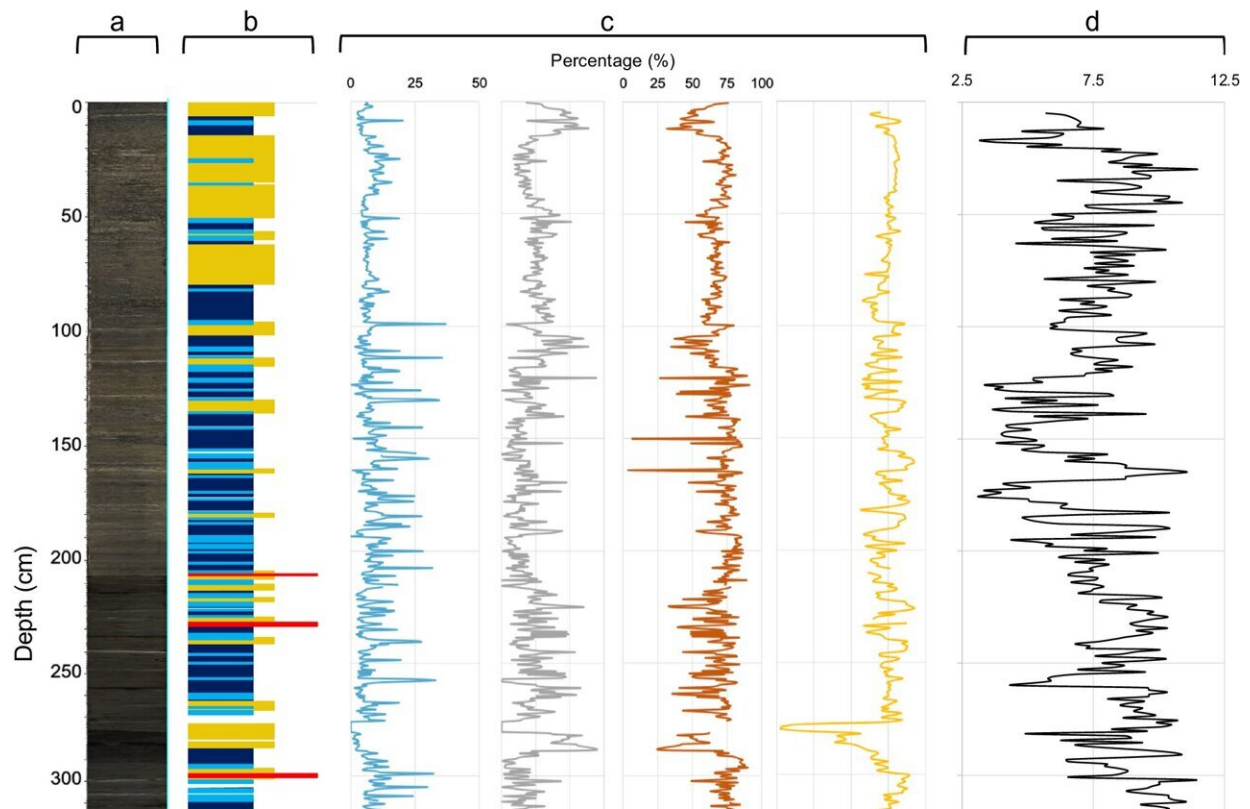


# A look at the past suggests atmospheric rivers inundating California could get worse

May 2 2024, by Bob Yirka



Lithological and geochemical results from Leonard Lake. Core analyses from Leonard Lake are plotted on the same depth scale (left): a Composite line scan imagery; b lithological descriptions based on visual analysis where clay layers are blue, fine laminations are black, homogenous areas are yellow, and sand layers are red and; c percentage data for clay (blue), total sand (gray), silt (orange), and non-carbonate inorganics (yellow); and (d) Si/Al values (black). Credit:

*Communications Earth & Environment* (2024). DOI: 10.1038/s43247-024-01357-z

A team of paleoclimatologists with the U.S. Geological Survey, NASA Ames Research Park, has found that atmospheric rivers in the past have dumped far more rain on California than those that have occurred over the past two years.

In their [paper](#) published in the journal *Communications Earth & Environment*, the group describes their study of sediment [core samples](#) collected from the bottom of Leonard Lake, in northern California.

Over the past two winters, parts of California have seen much more rain than is normal for the region. The reason for it has been the creation of what have come to be called [atmospheric rivers](#) over parts of the Pacific Ocean, which dump wave after wave of rain as they move over land.

Prior research has suggested that atmospheric rivers used to be more common in the region, and may have resulted in more rain than has been seen in modern times. Such studies have suggested that if certain conditions develop, more atmospheric rivers could form in the future, and that they could be bigger, leading to more rainfall than has been seen thus far.

For this new study, the researchers focused on the history of atmospheric rivers dumping rain on California. They traveled to Leonard Lake in northern California to collect core sediment samples. The lake was chosen due to its relatively stable history going back thousands of years and its geographical features.

The team collected core soil samples by pushing soil samplers down to the [lake](#) bottom from a boat. Their samples reflected layers deposited over approximately 3,200 years. Rain events over the years have resulted in the creation of sediment layers, allowing the team to see how much

rain had fallen during certain periods of California history.

In studying the core samples, the research team found evidence of the largest atmospheric river events, which both exceeded those from recent years, occurring two and three millennia ago and dumping massive amounts of rainfall in the region.

The findings by the team are relevant because prior studies have suggested [global warming](#) is leading to the likelihood of more atmospheric rivers forming over the Pacific—the [sediment](#) samples, the researchers note could be offering a glimpse of what could be in California's future.

**More information:** Clarke A. Knight et al, Atmospheric river activity during the late Holocene exceeds modern range of variability in California, *Communications Earth & Environment* (2024). [DOI: 10.1038/s43247-024-01357-z](#)

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