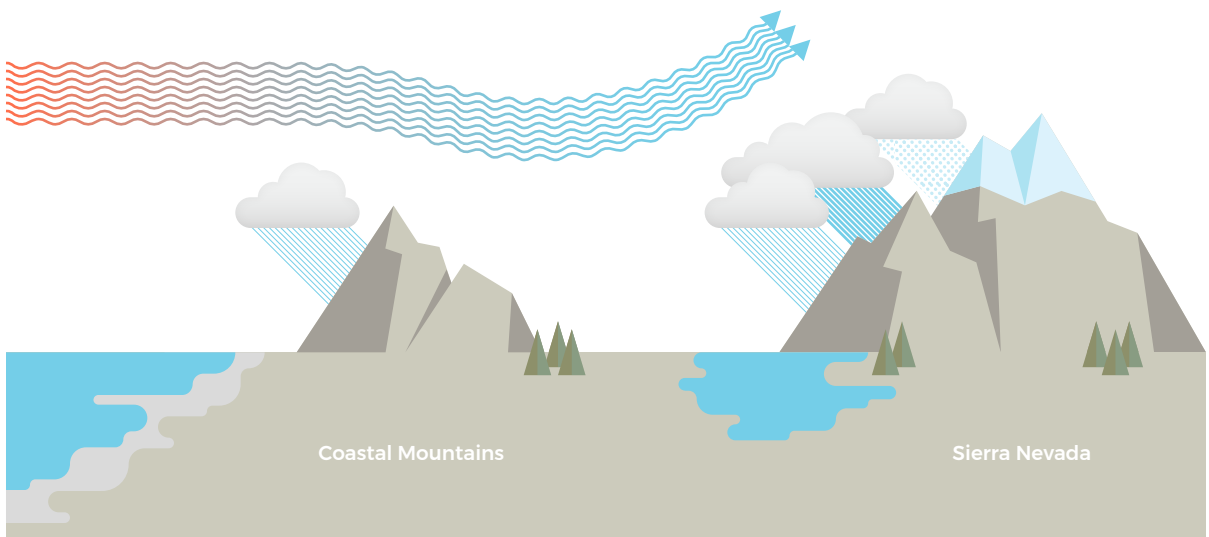


Intensifying Atmospheric Rivers in a Warming California

Atmospheric rivers are essential to California's water story, and understanding their future under human-caused climate change is key to water resources and flood control planning. Until now, climate models have provided a murky picture of these extreme storm systems. At UCLA, we've developed a method to simulate future atmospheric rivers at a high level of spatial detail.

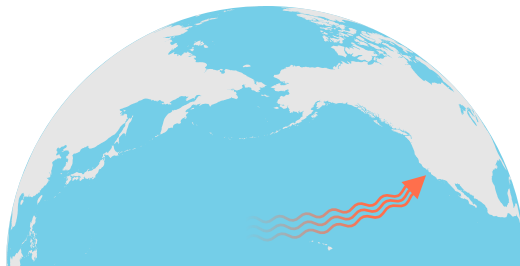
What is an atmospheric river?

Atmospheric rivers are narrow corridors of concentrated moisture flowing through the atmosphere. They form when evaporated ocean water collects in horizontal airstreams and is whisked hundreds or even thousands of miles across the ocean. When atmospheric rivers move over land—especially when they rise up over mountains—the air condenses rapidly, releasing (often heavy) precipitation.



California's Atmospheric Rivers

Rain and snow from atmospheric rivers originating over the Pacific replenish ecosystems and water supplies. But they can cause flooding if too much falls too fast.



20–50%

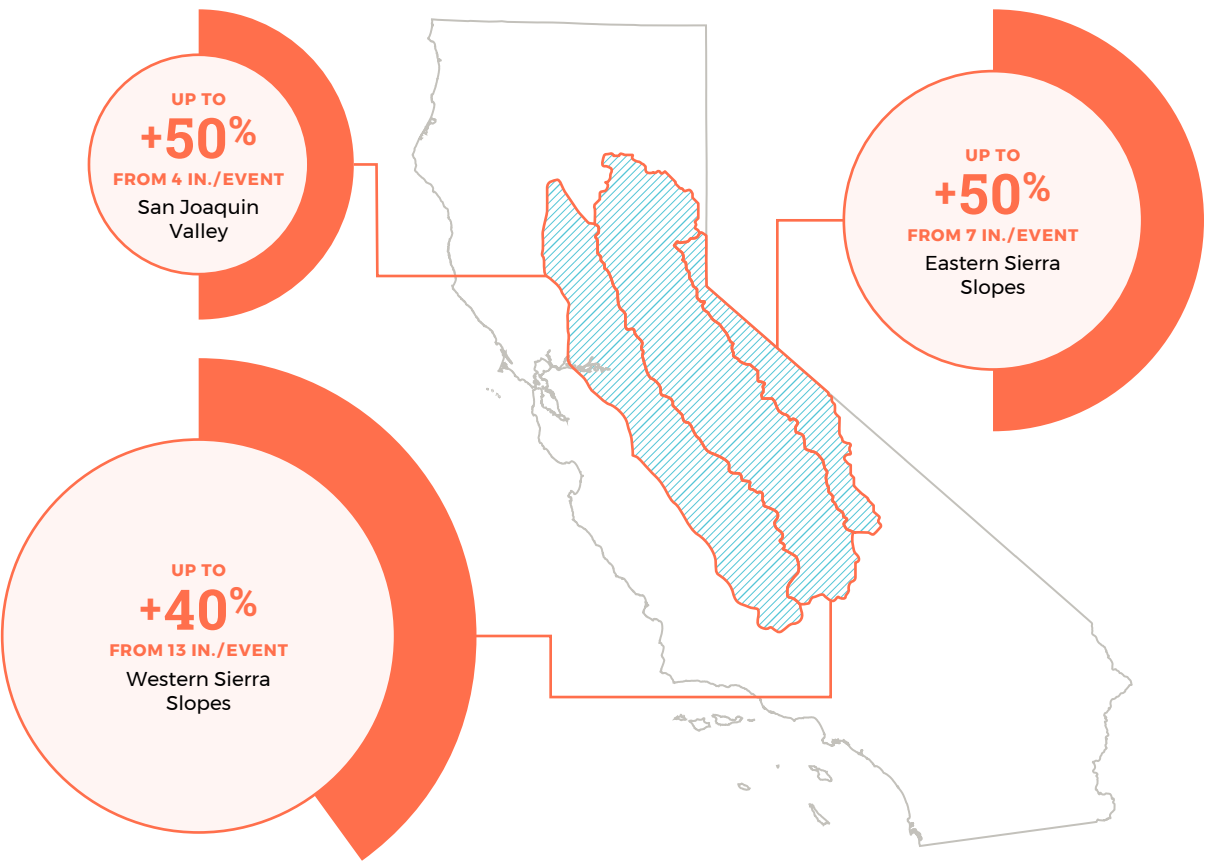
of California's annual water supply in any given year comes from precipitation carried by atmospheric rivers.

95%

of total insured flood losses in coastal California from 1978 to 2017 were caused by atmospheric rivers.

How might atmospheric rivers change?

Our climate modeling shows that extreme atmospheric rivers will get wetter. By the 2070s, if emissions of heat-trapping gases keep increasing at a rapid rate, our simulations show an increase of **24% on average** over Central California. Some places see greater increases. Some (like the Western Sierra) are very wet to begin with, so even a smaller percentage increase makes a big difference.



More Rain, More Quickly

Atmospheric rivers can bring a lot of rain in a short time. Our future projections show a **25–45% increase** in hourly rainfall rates, indicating that flash flood risk may rise too.

