



Ripple Effects of Barometric Shifts

Context is Key for Water Sector Resilience

Even small changes in the stability of the water cycle cause ripple effects:

Atmospheric rivers cause about \$1.1 billion in flood damage annually across the western US. Roughly 80% of levee breaches in California's Central Valley are associated with landfalling Atmospheric rivers which produce up to 50% of California's precipitation annually and 65% seasonally.

- Studies modeling future atmospheric rivers show rainfall will increase up to 40% more, range 15% larger in size, and last six hours longer per degree of warming.

Geologists suggest that removing so much weight from the crust (through river erosion) may allow parts of the crust to move more quickly, resulting in large earthquakes far from plate boundaries.

- The Gravity Recovery and Climate Experiment reveals that **major earthquakes (Mw 5 and above) always occur in the dry stage**, indicating drought and associated groundwater extraction is an important trigger for major earthquakes.

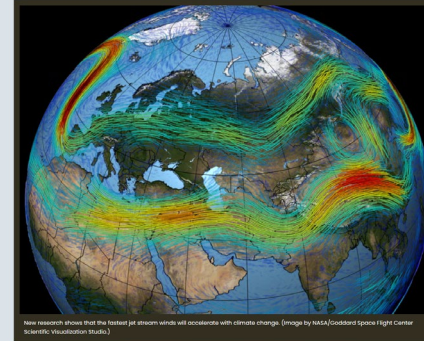
Less humidity in the west contributes to greater solar radiation intensity, due to the changes in absorption rates and reduces the scattering of the rays allowing more direct sunlight on surface.

- Evaporative demand is now emerging outside the range of the 1980-2000s, which means that **for every drop of water that falls, less water is likely to make its way into the rivers, lakes, reservoirs, and subsequently the aquifers.**

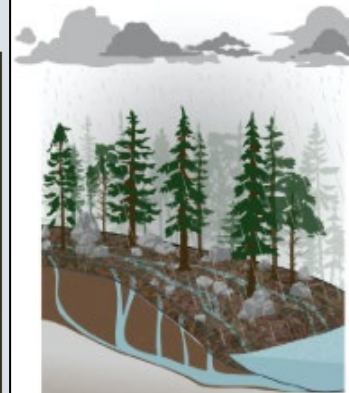
By 2050, sea levels in California are expected to increase between 6 and 14.5 inches (15 and 37 centimeters) higher than year 2000 levels.

- A 2024 study from Stanford researchers shows central **California's vast San Joaquin Valley has sunk at a record pace** (+1 foot annually) from 2006 to 2022.

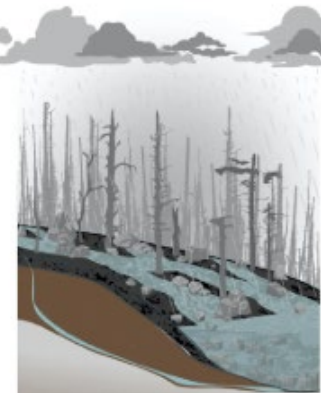
JET STREAM WINDS WILL ACCELERATE WITH WARMING CLIMATE
Faster winds likely to cause bumper flights, more severe weather
DEC 6, 2023 - BY STAFF



Unburned forest



Burned forest



Subsidence may cause areas which were not previously the lowest-lying area to take on more water than previous flood plans accounted for.

- Once subsidence causes ground collapse at the surface, the soils and materials which fall into the drying aquifer cause permanent damage to the groundwater system.

Soil collapse along roadways and sewer system pipelines can cause hazardous materials to enter the aquifer system and degrade water quality for all wells pulling downstream of the impacted site. **Even minimal subsidence can threaten critical infrastructure from dams to canals to building foundations.**

