

CALIFORNIA'S GROUNDWATER DEPLETION COULD MEAN MORE EARTHQUAKES

New study shows how aquifer draining in key agricultural region leads to mountain uplift and ground sinking, which causes stress to San Andreas Fault



Water in Southern California's Great Valley flows along the California Aqueduct. (Credit: Bill Hammond)

Groundwater depletion from California's thirsty agriculture industry could cause increased earthquake risks, a new study shows.

Published online Wednesday in the journal *Nature*, the study explores how the water draining leads to a sinking of the ground by a few millimeters yearly in the drought-plagued Central Valley, while the surrounding mountains experience uplift by about the same amount.

"When humans deplete groundwater," explained Maggie Benoit, program director in the National Science Foundation's Division of Earth Sciences, which funded the research, "the amount of mass or material in Earth's crust is reduced. That disrupts Earth's force balances, causing uplift of nearby mountains and reducing a force that helps keep the San Andreas fault from slipping."

As Roland Bürgmann, a geoscientist at the University of California, Berkeley and study co-author, stated, the uplift and sinking create stress on the infamous fault line.

"The stress is very small, much less than you need to build up stress on a fault leading to an earthquake, but in some circumstances such small stress changes can be the straw that breaks the camel's back," Bürgmann explained. "It could just give that extra push to get a fault to fail."

While other studies have linked this kind of small stress change to earthquakes, those changes "were thought to be driven by rainfall and other hydrologic causes," said study co-author and Western Washington University Assistant Professor of Geology Colin Amos. "But what our research suggests that the sustained loss of the groundwater and the resulting upward flexing of the ground surface may also contribute to or even drive these changes in stress," he said.

"The real importance of this research is that we are demonstrating a potential link between human activity and deformation of the solid Earth, which explains current mountain uplift and the yearly variation in seismicity," Amos stated.

"Given the current drought and most projections for climate change in California and elsewhere in the Western U.S., groundwater depletion will likely continue, and so will these phenomena," he continued.

Satellite data released earlier this year in an advisory report from the UC Center for Hydrologic Modeling (UCCHM) at the University of California, Irvine showed the state's water storage levels at a near decade low.

"The path of groundwater use that we are on threatens the sustainability of future water supplies for all Californians," stated UCCHM researcher Stephanie Castle, who contributed to the report.

In addition to the threatening water supplies, the *Nature* study now adds worry that the unsustainable water use could mean more earthquakes as well.

Source: <http://www.commondreams.org/news/2014/05/15/californias-groundwater-depletion-could-mean-more-earthquakes>