

California drought

February 10 2014, by Tony Phillips

California is supposed to be the Golden State. Make that golden brown. The entire west coast of the United States is changing color as the deepest drought in more than a century unfolds. According to the US Dept. of Agriculture and NOAA, dry conditions have become extreme across more than 62% of California's land area—and there is little relief in sight.

"Up and down California, from Oregon to Mexico, it's dry as a bone," comments JPL climatologist Bill Patzert. "To make matters worse, the snowpack in the water-storing Sierras is less than 20% of normal for this time of the year."

The drought is so bad, NASA satellites can see it from space. On Jan. 18th, 2014—just one day after California governor Jerry Brown declared a state of emergency—NASA's Terra satellite snapped a sobering picture of the Sierra Nevada mountain range. Where thousands of square miles of white snowpack should have been, there was just bare dirt and rock.

At the Jet Propulsion Lab, a group of researchers led by Tom Painter are preparing to fly a Twin Otter aircraft over the Sierras to investigate the situation. Their "Airborne Snow Observatory" is equipped with a laser radar and a spectrometer to measure the snow's depth and reflectivity. From these data, it is possible to calculate the water content of the Sierras within 5% and future snowmelt rates with similar precision.

"The Airborne Snow Observatory was designed for times like this when

we really need to know the state of the snow pack," says Painter. "Our next flight will be over the Tuolumne River Basin." The Tuolumne watershed and its Hetch Hetchy Reservoir are the primary water supply for 2.6 million San Francisco Bay Area residents.

The change in scenery is so striking, a group of high school science students in central California have been flying high altitude balloons to photograph it. From the stratosphere, their home town of Bishop looks like a settlement on the planet Mars: [image](#), [movie](#)

"The lack of snow is really striking," says 17-year-old Amelia Koske-Phillips, president of the Earth to Sky Calculus science club. "I've never seen a winter as brown as this," adds 16-year old Carson Reid, a member of the launch team.

Bill Patzert blames the drought, in part, on the Pacific Decadal Oscillation, or "PDO," a slowly oscillating pattern of sea surface temperatures in the Pacific Ocean. At the moment, the PDO is in its negative phase—a condition historically linked to extreme high-pressure ridges that block West Coast storms and give the Midwest and East Coast punishing winters.

"I'm often asked if this is part of global warming," says Patzert. "My answer is 'not yet.' What we're experiencing now is a natural variability that we've seen many times in the past. Ultimately, though, climate change could make western droughts much worse."

Provided by NASA

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