

Atmospheric river poised to soak Sacramento

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Water vapor – Mississippi River-size amounts of it flowing at hurricane speeds miles above the Earth – is hurtling across the Pacific, an atmospheric river poised to drench a parched Northern California and the Sacramento region as early as Thursday night.

A crack team of science experts is going along for the ride, part of an experiment known as CalWater 2015, many of whom gathered at McClellan Park near Sacramento on Tuesday in preparation for the major weather event and the vital information they hope to pull from the phenomenon.

“It’s a real milestone for us. Nothing of this scope has happened,” said Marty Ralph, director of the Center for Western Weather and Water Extremes at Scripps Institution of Oceanography in San Diego, of the project he’s helping to lead. “One of the drivers of CalWater was the uncertainty of climate projections. We haven’t had the data to measure the strength and structure of ARs. ... There’s so much potential for the monitoring of atmospheric rivers.”

They come from an alphabet soup of agencies, universities and scientific institutes, from NOAA to NASA, USGS and the DOE, to study atmospheric rivers and the role they play in water supply. The researchers will cast a wide net from the Sierra Nevada to the Coast Range and into the Pacific Ocean during a storm system that CalWater forecasters said will produce “copious” amounts of rain into Saturday.

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“There will be ample opportunity to store this water, hopefully, and provide a little relief from the drought,” said Allen White, a research meteorologist at the National Oceanographic and Atmospheric Administration.

The information the scientists glean, they hope, will help do nothing less than predict the future of water and weather in a California at the mercy of both. Think of atmospheric rivers as a massive water vapor pipeline, responsible for many of the major storms along the West Coast and about half of the rain and snow Northern California sees each year.

Knowing how atmospheric rivers are formed, how strong they are and where they will land can help communities and water experts in California and the West. They can better plan for water storage, storm and disaster preparedness, drought and climate change.

“This information is invaluable. We can take all these solutions and find where the biggest impacts are going to be,” said Michelle Mead, a warning coordination meteorologist at the National Weather Service in Sacramento. “The bigger heads-up we can get, the better.”

From McClellan, meteorologists and atmospheric chemists will take to the air aboard aircraft carrying sensors to sweep the storm for data such as moisture, wind speed and aerosols – the fine dust and other particles that scientists say hold clues to how ice crystals are formed.

At sea, researchers will track the storm to measure clouds and how they are influenced by atmospheric rivers. Scientists on the ground will measure soil moisture, snow level, precipitation and the properties that form clouds and ice. Even astronauts aboard the International Space Station are being enlisted into the effort.

The amount of brainpower and science brought to bear on the CalWater project speaks to how much remains to be

learned about atmospheric rivers and how vitally important they are to Northern California's water supply.

"We already know there's a high supply of water vapor in the atmosphere, but we don't know how that's converted to rain and snow," White said. "This research is vitally important if we ever want to predict extreme events."

CalWater 2015 also shifts the focus to the unique challenges California and other Western states face with water supply, Ralph said.

"The Western coastal states have unique needs," he said. "If you look across the nation at variable rainfall, the most variable from year to year is California. Our (precipitation) comes and goes in big waves."

That has been especially true during Northern California's historic drought, including a bone-dry January in Sacramento and San Francisco. Normally, California sees five to seven atmospheric river events a year. Thursday night's will be just the third following December's welcome rainstorms.

With an increasingly rare atmospheric river event just days away, CalWater scientists are eager to seize the moment.

"We want to turn this data into knowledge. We have to turn this data into understanding – to use these models to predict the future," said Ruby Leung, an extreme weather and climate expert at Pacific Northwest National Laboratory in Washington. "It's important to capture this opportunity."

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