

WEATHER

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But although these satellites can track a storm forming in the Pacific Ocean several days before it drops 6 inches of snow in Baker County, they might not detect a local temperature inversion that has a significant effect on the weather in an area as small as Baker Valley.

That’s why employees at the Weather Service office near the Boise Airport twice a day launch a hydrogen-filled balloon that lifts weather sensors about 100,000 feet.

As the balloon rises, the sensors record and relay to the NWS office temperature, humidity, wind speed and direction and other data that help meteorologists fine-tune forecasts, Breidenbach said.

The balloons yield what Breidenbach describes as an extremely detailed “vertical profile” snapshot of the atmosphere — something that much more sophisticated devices, such as orbiting satellites and Doppler weather radar, can’t deliver.

The balloons determine, among other things, the freezing level, which affects at which elevation snow will fall.

Doppler’s strengths, and limitations

Doppler radar is one of the most advanced ground-based technologies the Weather Service employs to scrutinize the atmosphere.

The radar, which is enclosed in a bright white building that resembles nothing so much as a giant puffball mushroom, sends out a radar beam that detects rain and snow and wind direction (based on whether air is moving toward or away from the radar station).

Doppler radar, which the Weather Service installed near the Boise Airport in the early 1990s, is the reason that an office in Idaho tracks weather in, and issues daily forecasts for, a large chunk of Eastern Oregon, Breidenbach said.

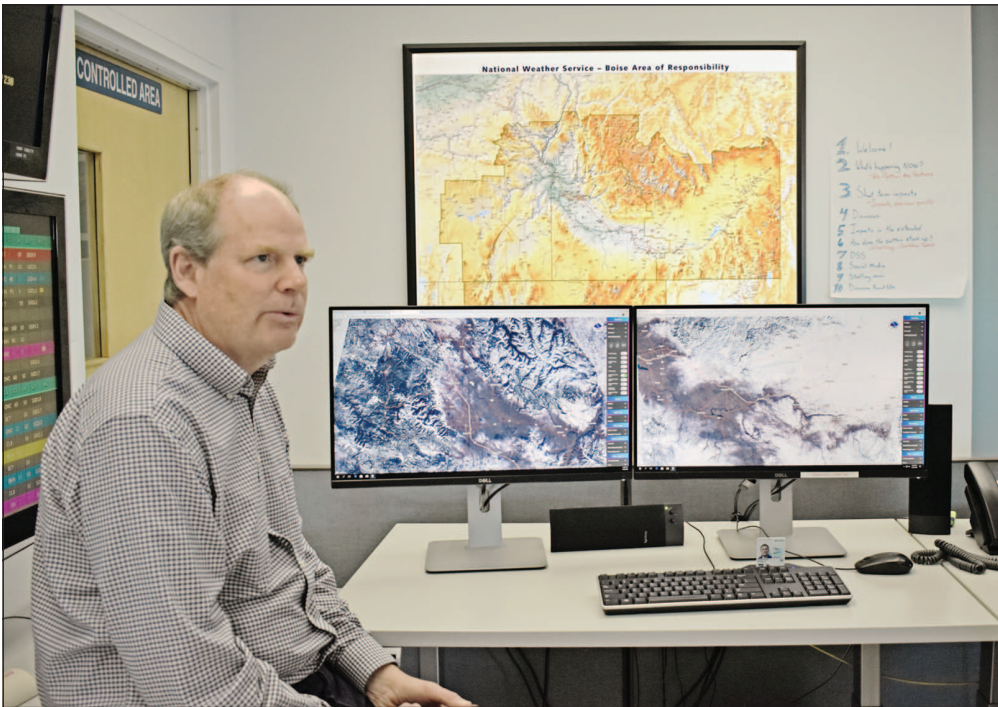
The Boise Doppler station, which is about 5 miles south of the airport, has a much better “view” of Baker, Malheur and Harney counties than does the nearest other radar, at the Eastern Oregon Regional Airport in Pendleton.

That’s because the Blue Mountains largely block the Pendleton Doppler radar’s beam from reaching into Baker County.

(Although the radar can be effective as far as 300 miles in flat or gentle terrain, it can’t penetrate solid rock. Breidenbach said the Doppler radar in Boise was upgraded in 2012 to “dual polarization” capability, which means the radar can measure both the vertical and horizontal dimensions of its targets, including raindrops. That helps forecasts better gauge how intense rainfall is, among other things.)

The Boise Doppler’s insight into Baker County isn’t without blind spots, however.

Breidenbach said that because the radar beam has to be angled upward to clear high ground between Boise and Baker City, it sometimes overshoots, as it were, the relatively low clouds that



Lisa Britton/For the Baker City Herald

Jay Breidenbach is the warning coordination meteorologist at the National Weather Service office in Boise. He’s looking at monitors showing satellite images depicting snow on the ground.



Kathy Aney /EO Media Group file photo-2010

Dennis Hull of the National Weather Service with the Doppler radar at the Eastern Oregon Regional Airport in Pendleton. Hull retired in 2018.

sometimes drop rain or snow. The result is that the radar map might show little or no precipitation in and around Baker City even when snowflakes are falling.

Another limitation has to do with thunderstorms.

The 9,700-foot bulk of Steens Mountain, south of Burns, forms a formidable radar blockage from Boise of the high desert areas that spawn many summer storms, Breidenbach said.

By the time thunderheads are either tall enough that the radar can “see” them, or the cells have moved north and beyond the obstacle of Steens Mountain, they’re often just a few hours from arriving in the Baker City area, he said.

“That’s a short-range forecast problem,” Breidenbach said.

The Boise office is one of 122 in the Weather Service’s nationwide network of forecast offices. Each office’s area of responsibility is based in part on its Doppler radar coverage, Breidenbach said.

There are just two forecast offices in Idaho — Boise and Pocatello.

Boise, in addition to covering Baker, Malheur and Harney counties in Oregon, issues forecasts, warnings and other information for most of the western and southern sections of Idaho.

Oregon has three National Weather Service offices — Pendleton, Portland and Medford.

Pendleton oversees the parts of Northeastern Oregon

that Boise does not, including Union, Wallowa, Grant and Umatilla counties, as well as much of Central Oregon extending west to the Oregon Cascades.

Computer monitors and models

The Boise office’s staff of about 24 includes five lead forecasters and seven general forecasters, as well as administrative and technical support staff, the latter is responsible for maintaining the Doppler radar and the office’s network of computers and other equipment.

The forecasters’ work stations are dominated by computer monitors. Some display images familiar to anyone who has watched a TV station’s weather report — scrolling sequences of white clouds depicted on a black backdrop.

But others are festooned with multiple lines, in a palette of colors, that are all but inexplicable to the layperson.

The office is quiet, save for the low hum of computer fans and the occasional clack of fingers tapping a keyboard.

Chuck Redman, the Boise office’s fire weather forecaster, wears jeans and a plaid shirt. From his desk chair he can survey three monitors in his cubicle, as well as two big-screen versions on a nearby wall.

With a click of his computer mouse Redman can survey current weather — gathered at ground stations such as the Baker City Airport as well as data from the upper atmo-

sphere collected by the satellites — and sample any of the several computer-generated models that are an integral ingredient in concocting the forecasts the office issues daily.

One of his monitors is configured to show four models simultaneously.

These models are one reason the Weather Service is a major user of some of the world’s most powerful supercomputers, Breidenbach said.

Those computers are at the National Oceanic and Atmospheric Administration headquarters in Silver Springs, Maryland. Only the fastest computers — ones that are to your laptop what a Saturn 5 rocket is to a family car — are capable of digesting the billions of pieces of data that at any instant make up the conditions in the atmosphere.

Think of it this way — to predict with anything resembling accuracy the weather conditions for a given point on the planet’s surface tomorrow, much less a week from today, the models must take into account various conditions, such as temperature, humidity and wind, from the surface up to more than 50,000 feet altitude, and over areas measuring in the hundreds of thousands of square miles.

Some of these models predict conditions for a relatively small area out to 18 hours, while others attempt to forecast weather throughout the Western Hemisphere for the next week, or global conditions for the next two weeks,

“We tend to be more confident in the forecast if all the models show the same thing and they’ve been consistent over several days.”

— Jay Breidenbach, warning coordination meteorologist, National Weather Service office in Boise

Breidenbach said.

The “latest and greatest” development in modeling is the “ensemble,” he said.

The basic idea is to run a set of models as much as 100 times, each time starting with slightly different conditions or different versions of the models. This helps to account for the inherent instability in the atmosphere and gives forecasters a wider range of potential future conditions to consider, Breidenbach said.

Ensembles have a major influence on how confident forecasters are in their predictions, and that in turn affects how specific those forecasts are — the difference, say, between calling for 3 to 5 inches of snow or a more hedging prediction of 2 to 8 inches.

Redman said forecasters’ confidence on details such as temperatures and the likelihood of precipitation depends largely on consistency among the models.

In some cases each model, including the ensembles, will depict a similar, or even basically identical, weather pattern — all will predict a storm arriving in Baker County on a particular day, for instance.

“We tend to be more confident in the forecast if all the models show the same thing and they’ve been consistent over several days,” Breidenbach said.

But at other times there can be significant differences among models, he said — occasionally even to the point that one model predicts fair weather while another portends foul.

The level of forecasters’ confidence based on models doesn’t show up in the public forecasts that Weather Service offices post on their websites, at least not explicitly.

To get something closer to an insider’s view you need to read the “forecast discussion,” which is also publicly available under the “forecast” tab on Weather Service websites, if not as widely read as the forecasts themselves.

These discussions, which generally run a few hundred words and are issued four times each day, are written by forecasters and go into some detail about the factors, including consistency or lack thereof among models, that went into making the forecast.

Breidenbach chuckles as he admits that he reads the forecast discussion from the Boise office even when he’s at home.

“We all kind of love the weather,” he said.

Technology improves, but humans play vital role

Computer models have improved steadily over the past couple decades, Breidenbach said.

That’s due in part to technology such as the GOES satellites, which vastly increase the amount of data the supercomputers chew on before spitting out their predictions.

The accuracy of models has increased so much that the

Weather Service’s forecasts, which are graded much like a student’s homework, are as accurate out to five days as they were out to three days just a decade ago, Breidenbach said.

Still and all, the models aren’t nearly savvy enough to render the human element in forecasting weather superfluous, he said.

The models are adept at tracking large-scale features such as the storms that form every winter in the Pacific Ocean — a tempest that sprawls over thousands of square miles is tough to miss from a vantage point 22,000 miles up.

To cite a recent example, Breidenbach said all the models agreed that a series of storms would bring copious amounts of snow to the mountains of Eastern Oregon and Western Idaho in mid-January.

And as skiers and snowplow drivers can attest, that’s what happened.

But when it comes to the details, Breidenbach said some models tend to have, in effect, biases — one will consistently forecast more rain or snow than what actually falls, for instance.

This can of course be crucial — whether 1 inch of snow falls, or half a foot, can determine whether or not freeways close.

Over time, Weather Service forecasters recognize these tendencies, and they factor these into their forecasts rather than relying solely on the models, he said.

(This matter of humans overriding the computers is even more critical when it comes to forecasting weather in regions such as Baker County, where topography can have major effects. See the Tuesday, Feb. 4, issue for a more thorough look at that topic.)

On the morning of Jan. 22 at the Boise office, Breidenbach illustrated how forecasters use models as a guide only.

He pointed to one of Redman’s monitors, where a model predicted a high temperature the next day of 44 degrees in Baker City.

Breidenbach and Redman said forecasters who issue the public forecast would likely trim a few degrees because they knew there was snow on the ground in Baker City. Since snow reflects rather than absorbs much of the sun’s heat, a factor the models don’t always acknowledge, model guidance for temperatures can be too high when snow is present.

Indeed, the high temperature at the Baker City Airport on Jan. 23 was 41 degrees.

Breidenbach said that although he’s confident that forecast models will continue to improve, he’s equally certain that the Weather Service will need meteorologists, and in particular their institutional knowledge of local conditions, to ensure forecasts are as accurate as possible.

Welcome, Dr. Brandon Snow

Baker Dental Group would like to welcome Dr. Brandon Snow to their General Dental practice. Dr. Tod Chandler will be retiring in February and Dr. Brandon Snow will be the new partner with Dr. Justin Bingham. Dr. Chandler would like to sincerely thank all of his patients, staff and friends for many years of enjoyable association. All of us at Baker Dental Group have every confidence in Dr. Snow and are excited to welcome him to the practice.

Brandon was born and raised in Boulder City, Nevada, a small town outside of Las Vegas. After graduating high school, he attended Brigham Young University where he met and married Jill Richards of Baker City. The couple moved to Las Vegas where Brandon completed his formal education at the University of Nevada, Las Vegas School of Dental Medicine in 2016. For the past 3 1/2 years they have been in Fruitland, Idaho while Brandon has worked for Valley Family Health Care in Ontario and Nyssa. They are excited to be moving to Baker City with their family to a community that they love.



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