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# Understanding our mountain: Exhibition explores climate conditions on Mt. Washington through art and science

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Most of my college environmental studies experience stayed in the realm of theory, policy, and, let's face it, the politics of climate change.

Then the summer after my junior year, I accidentally received an internship in the Colby Sawyer College water quality lab. (The lab manager didn't realize this English major had no *actual* lab experience – just enthusiasm for learning about nature – until we were two weeks into the internship).

She decided I was competent enough to keep around. So I spent the next three months running repetitive tests on water samples, collecting some of those samples in the ever-fashionable waders, and one glorious afternoon a month, gathering “deep site” samples in the middle of Lake Sunapee.

Through that data, combined with actually living on Lake Sunapee, I gained a new intimacy with the place from my childhood memories.

I also started caring whether people kept shrubs along the shoreline, preventing erosion. I was personally alarmed when we picked up a particularly high E. coli reading.

It was with a sense of reverence that I watched – and often took photos of – the sunset over the lake each night.

Between the scientific, experiential and personally artistic representations of what was happening in Lake Sunapee, that summer provided the best environmental education I could get.

Not everyone gets the chance to have this immersive experience (perhaps just a few English majors). But the Museum of the White Mountains at Plymouth State University is offering Granite Staters connection and understanding, through science and art, to a

natural environment most people here have some personal experience with: Mount Washington.

## **Place-based art**

Plymouth State University assistant art professor Kimberly Ritchie has been making art focused on the environment for the past decade. Usually, she said, her pieces are her response to the climate conditions she observes, like drought in Joshua Tree, Calif., or glacial melting in Iceland.

"I really go there with trying to understand what's happening in that area," Ritchie said.

About a year ago, Ritchie hoped to curate an environmental exhibition for the Museum of the White Mountains. Specifically, she wanted to combine art and science.

She collaborated with Eric Kelsey, a meteorology research assistant professor and the director of research at the Mt. Washington Observatory, and he already had a project in mind. He wanted to know why the summit of Mt. Washington was bucking the climate change trend, and was warming more slowly than the mountain valley.

In other places around the world, data has shown higher elevations warming more quickly.

Centering on a place everyone in New Hampshire is familiar with, Ritchie said, was ideal for bringing some of the big, abstract concepts about climate, natural systems and scientific data, home.

"It was a perfect fit for the show . . . to focus what's going on in our local area," Ritchie said.

## **The science**

The first step in the project was performing the scientific study on Mt. Washington. Kelsey started with a hypothesis as to why the summit was warming more slowly than other high elevations: the atmosphere.

"I think at least part of it has to do with, the summit of Mount Washington spends equal amounts of time in two layers of the atmosphere," Kelsey said.

In the boundary layer, or the atmosphere us humans spend most of our time in, the sun heats the ground, the ground heats the air, and then the air rises.

But it only rises to where the boundary layer meets the free troposphere. That's the layer of atmosphere where you want to fly an airplane – it's smooth and moves in horizontal currents.

Kelsey said that puffy cumulus clouds are a good indicator of atmosphere – boundary layer below, free troposphere above.

And on Mt. Washington those cumulus clouds shift in elevation. This means the summit basks half the time in the toasty top of the boundary layer, and then it spends the other half in the smoother free troposphere.

Kelsey said that would explain why the summit wasn't warming similarly to other higher elevations in one layer of atmosphere.

"Mount Washington sits at this goldilocks elevation," Kelsey said.

To test this theory, Kelsey and his team spent several days on the mountain last summer, using weather balloons and a water vapor isotope analyzer.

The latter tool, Kelsey explained, measures the atomic weight of oxygen. Heavier oxygen molecules are grounded in the boundary layer, while lighter ones ascend to the free troposphere.

By using these methods for the collaborative art-science project with Ritchie, Kelsey said he hoped to establish a reliable method for measuring the height of the boundary layer of atmosphere.

Eventually, he'd like to do a larger study, confirming this hypothesis as the reason for Mt. Washington and other, similar-height mountains in the Northeast bucking the climate data trend.

## **The art**

Kelsey wasn't exactly sure what the art piece of this Mt. Washington project would look like. Then one day he sat through a Plymouth State University faculty meeting before the fall semester, sketching absentmindedly.

"I'm not much of a sketcher," Kelsey admitted. "But I felt like I had some ideas."

He created a sketched model of what he thought was the interaction between the two atmospheric layers and the Mt. Washington summit on one of the summer field days. The model included four depictions, each showing a different part of the day.

In the final piece titled "Boundary Layer Project," a cleaned-up version of Kelsey's sketch is overlaid on the silhouette of Mt. Washington.

The display at the Museum of the White Mountains includes timelapse footage of clouds projected onto the sketch and mountain silhouette.

Reflecting on the final piece, Kelsey said he's glad for the opportunity to convey his scientific ideas in a different format.

"Scientists – we have our own way of visualizing and understanding the meaning of observations we collect," he said. "The real importance of involving artists is involving a broader audience. In order for the research I do to have a positive impact, it needs to reach

a wider audience.”

## Connection

Kelsey’s piece was put together with the help of Ritchie and Ashland artist Shandra McLane. It’s just one of numerous science-driven art works in the exhibition titled, *Forecasting: Climate Change and Water Impact*.

While not everyone may be comfortable with either scientific information or art, and though just the term “climate change” is politically controversial, museum staff said they hope the different ways information is presented in their exhibition will reach different constituents.

Co-curator and assistant director of the museum Cynthia Robinson said there has already been a diverse group of people visiting the exhibition: students, members of the public, senior home groups.

“Most people feel comfortable walking into an art museum,” Kelsey said. “That’s where we can start inspiring change on a much broader level.”

Anyone interested can visit *Forecasting: Climate Change and Water Impact* at the Museum of the White Mountains at Plymouth State University, where it will be on display until April 21.

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