
My NASA Data - Mini Lesson/Activity

Mud From the Sky?

Grade Band

- 6-8

Time

- 30 minutes

Overview

Students review different maps of wind trajectories to determine to origins of mud-laden rain in the Pacific Northwest.

Student Directions

Mud from the Sky?

In 2015 a strange event occurred in the Pacific Northwest. Muddy rain fell from the sky. Where did the mud come from? Was it soil blowing in the wind? Volcanic ash from far away? Why was the area impacted limited? What conditions came together to drop this mystery rain?

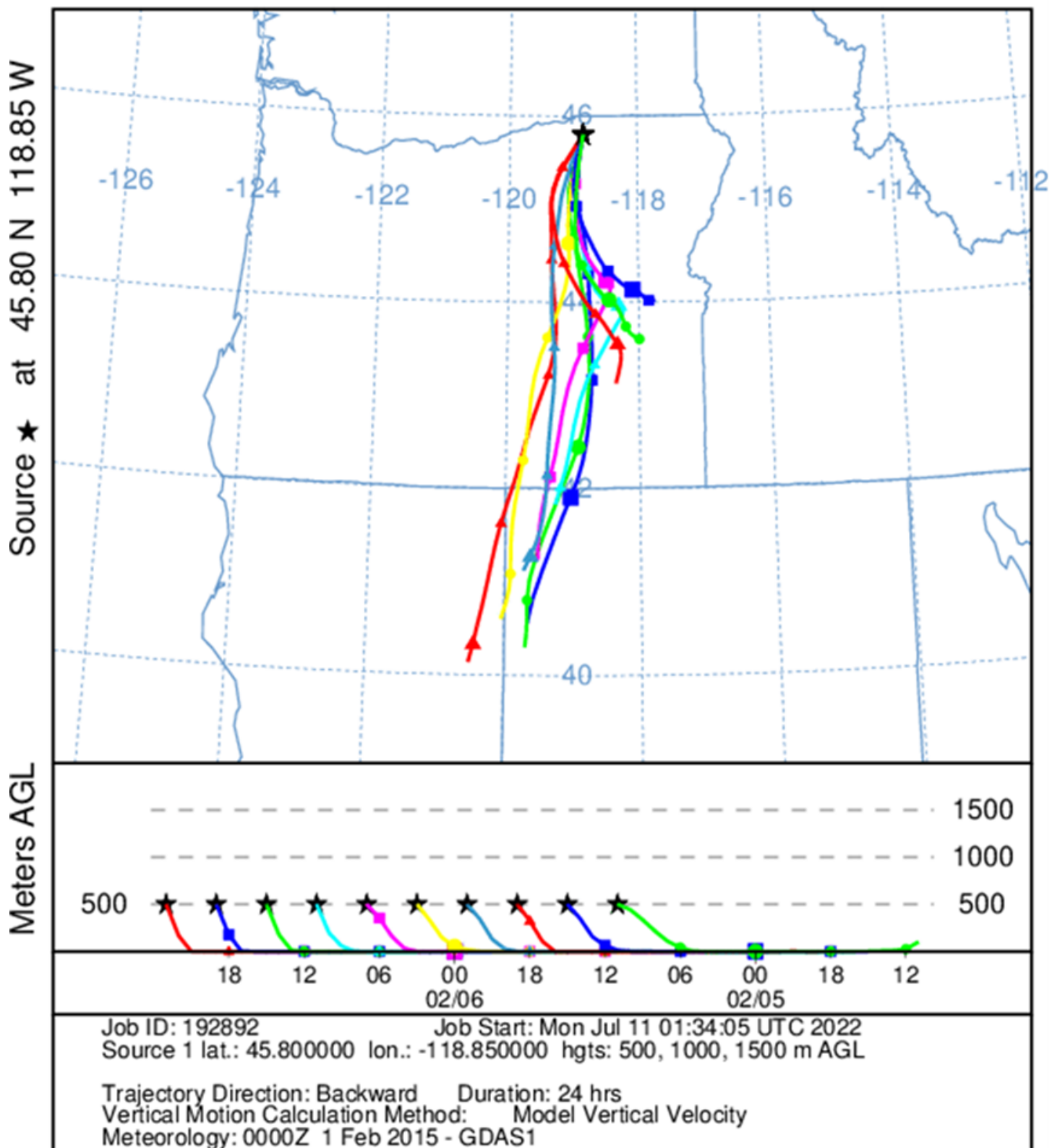
To determine the source scientists needed to know what the particles were made of as well as where they came from. A sample was analyzed and volcanic ash and space dust were ruled out. The very fine particles came from a dry lake bed, but where?

Scientists used a method known as trajectories to figure out where the wind came from, including what areas the wind had passed over. The rain event was an expected weather system and not part of the mystery.

Focus on the maps rather than the graphs below them.

Trajectory 1 shows where the wind that arrived over Pendleton, Oregon on February 6, 2015 passed over.

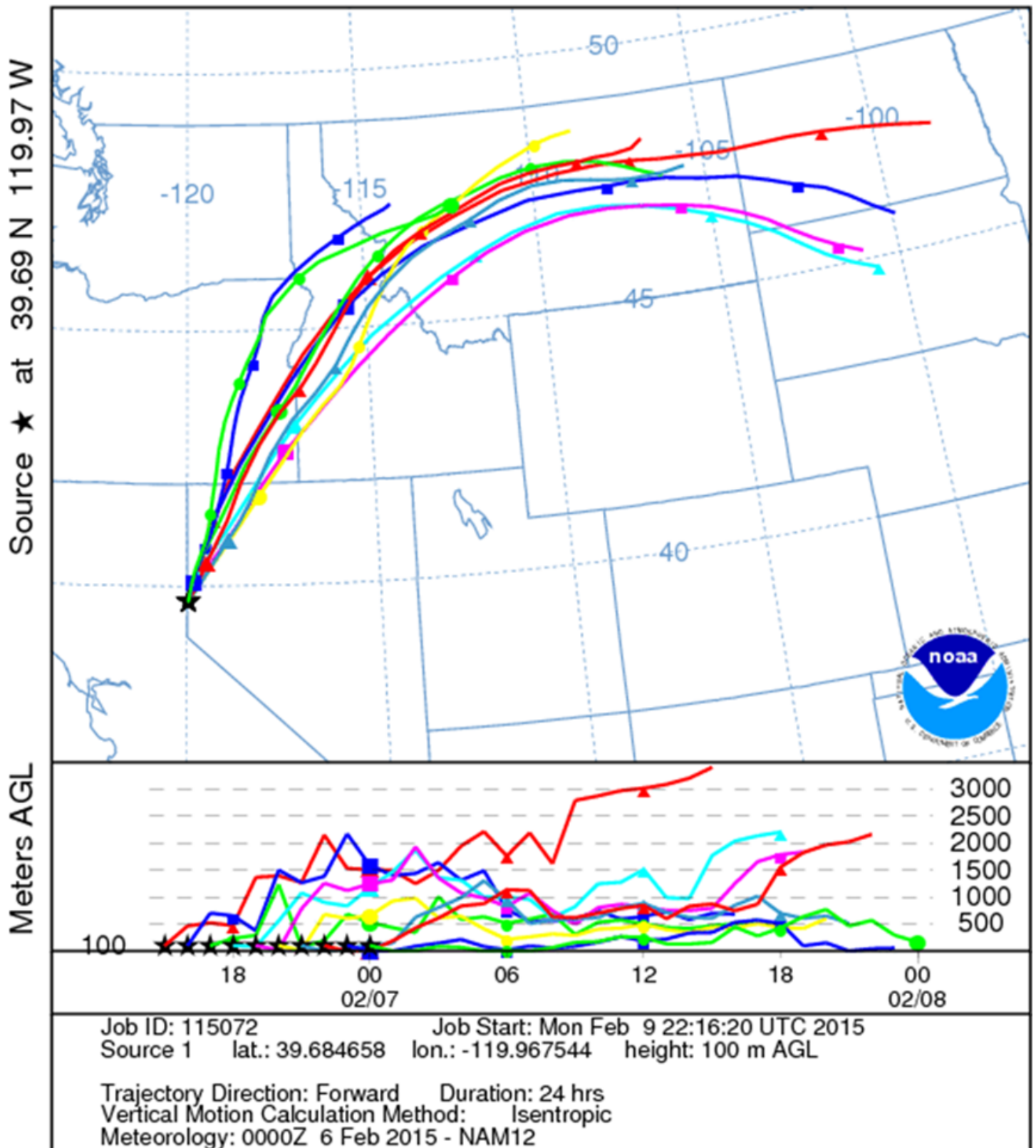
NOAA HYSPLIT MODEL
Backward trajectories ending at 2300 UTC 06 Feb 15
GDAS Meteorological Data



[HYSPLIT model, Forward Trajectories, Pendleton, Oregon. Source: NOAA | https://mydasdata.larc.nasa.gov/sites/default/files/inline-images/HYSPLIT%20Oregon%20to%20Montana_0_2.png](https://mydasdata.larc.nasa.gov/sites/default/files/inline-images/HYSPLIT%20Oregon%20to%20Montana_0_2.png)

Trajectory 2 shows where air that started in Reno, Nevada passed over.

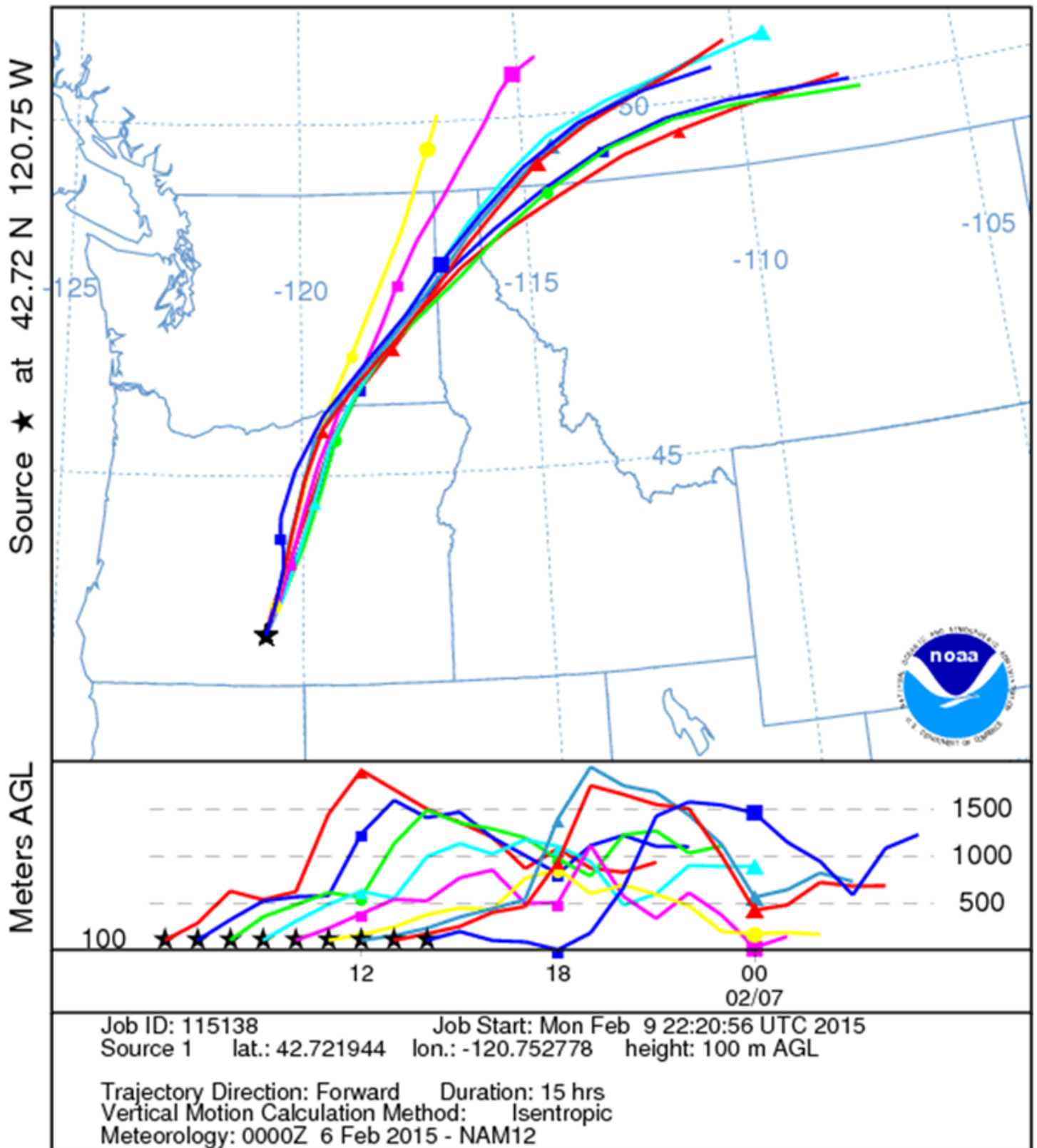
NOAA HYSPLIT MODEL
Forward trajectories starting at 1500 UTC 06 Feb 15
NAM Meteorological Data



[HYSPLIT model, Forward Trajectories, Reno, Nevada. Source: NOAA | https://mynasadata.larc.nasa.gov/sites/default/files/inline-images/HYSPLIT%20Oregon%20to%20Montana_1_0.png](https://mynasadata.larc.nasa.gov/sites/default/files/inline-images/HYSPLIT%20Oregon%20to%20Montana_1_0.png)

Trajectory 3 shows where air that passed over a point in south central Oregon went.

NOAA HYSPLIT MODEL
Forward trajectories starting at 0600 UTC 06 Feb 15
NAM Meteorological Data



HYSPLIT model, Forward Trajectories, south central Oregon. Source: NOAA | https://mydasdata.larc.nasa.gov/sites/default/files/inline-images/HYSPLIT%20Oregon%20to%20Montana_2.png

Steps:

1. Check with your instructor on how to submit your answers.
2. Trajectory 1 is a backward trajectory, while 2 and 3 are forward trajectories. Explain what this means.
3. Identify the similarities between all three trajectories?
4. Explain the difference between all three trajectories?
5. Once scientists knew the material came from a dry lake bed, how could these trajectories be used to find the source?

For a summary of what really happened, see the [article](#) below:



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Weathercatch: Solving riddle of the milky rain that fell seven years ago this month

PUBLISHED ON MARCH 14, 2022

The Inland Northwest is used to precipitation in February, but not the kind that fell on Feb. 6, 2015.

That Friday morning, a mysterious milky rain began to fall in parts of Eastern Washington, including here in Spokane, and northeast Oregon. It left a chalky sheen on cars and windshields, people's coats and along roadside curbs.

And it was a mystery that took weeks to solve. Theories ranged from ash blown by a volcanic eruption in Russia and another in Mexico, a Nevada dust storm and ashy particles from burn scars left by Pacific Northwest wildfires that summer.

Ultimately, all of those sources were ruled out, as were aliens and chemtrails. Working with scientists at Washington State University, including a hydrochemist, two geologists and an atmospheric scientist, our group concluded that the source of the milky rain was an ancient saline lake bed in remote Oregon, nearly 500 miles away.

[Weathercatch: Solving riddle of the milky rain that fell seven years ago this month. Source: Washington State University | <https://mynasadata.larc.nasa.gov/sites/default/files/inline-images/Weathercatch.png>](#)

Sources:

1. Air Resources Laboratory - HYSPLIT - Hybrid Single Particle Lagrangian Integrated Trajectory model. (2022, January 4). <https://www.ready.noaa.gov>. Retrieved August 23, 2022, from <https://www.ready.noaa.gov/HYSPLIT.php>
2. Loyd, N., & Weiford, L. (2022, February 24). Weathercatch: Solving riddle of the milky rain that fell seven years ago this month. The Spokesman-Review. Retrieved August 30, 2022, from <https://www.spokesman.com/stories/2022/feb/24/weathercatch-the-riddle-o...>

Teacher Note

Teachers, these mini lessons/student activities are perfect "warm up" tasks that can be used as a hook, bell ringer, exit slip, etc. They take less than a class period to complete. Learn more on the "[My NASA Data What are Mini Lessons?](#)" page.

Teachers who are interested in receiving the answer key, please complete the [Teacher Key Request](#)

[and Verification Form](#). We verify that requestors are teachers prior to sending access to the answer keys as we've had many students try to pass as teachers to gain access.

NGSS Three Dimensional Learning

NGSS Disciplinary Core Ideas

- ESS2D: Weather and Climate

Crosscutting Concepts

- Cause and Effect

Science and Engineering Practices

- Analyzing and Interpreting Data

Document Resources

- [Mud from the Sky Images](#)