

Los Angeles seeds clouds to boost rainfall after five years of drought

By Scientific American, adapted by Newsela staff on 06.01.16

Word Count **810**



An agricultural aircraft flies over Thailand in a bid to seed clouds July 9, 2015. Photo: REUTERS/Chaiwat Subprasom

During three separate storms in the past two months, workers for the L.A. County Department of Public Works ignited 25 special flares in the hills above Pasadena. The flares sent columns of glittering smoke into the clouds.

Silver Iodide To Boost Rainfall

The smoke glittered because it contained silver iodide. The metallic compound can help boost rainfall levels.

Such attempts to artificially increase rainfall are known as cloud seeding.

Pasadena's latest efforts mark the first time since 2002 that the parched city has seeded clouds. It is currently enduring a nearly five-year-long drought with this winter's rainfall at just 40 percent of the usual amount.

Faint Hope Is Better Than Nothing

Many scientists believe cloud seeding has limited effectiveness at best. However, even the faint hope of wresting more water from the vast reservoir in the sky remains impossible to resist.

The Public Works Department has overseen cloud seeding efforts in the Los Angeles area for more than 50 years. It sees the process as a way to cut down on the expense of water imported from other parts of California and elsewhere.

“Storm water is 85 percent less expensive than imported water,” says department spokesman Kerjon Lee.

Running The Rain "Generators"

The department estimates that cloud seeding can generate 5.7 billion liters of extra water over an October to April season. It claims it would have to pay out \$3 million to buy that extra water. By contrast, North American Weather Consultants, the company that carries out the cloud seeding, charges \$550,000.

In the foothills of the San Gabriel Mountains east of the city, North American runs 10 rain “generators.” These consist of six hand-operated burners and four remotely operated flare trees. Each burner or flare sends up 15 grams of silver iodide.

Silver iodide has been shown to promote ice crystallization in a cloud. It is ideal for this purpose because its chemical structure is very similar to that of ice. The similarity encourages natural ice crystals to form.

Hard To Tell If It Works

In a rain cloud in which water vapor has become supercooled without freezing, particles of silver iodide can make ice crystals form around themselves. More ice builds up around these small crystals until they grow heavy enough to fall as rain or snow. The extra rainfall is captured by L.A. County reservoirs or absorbed into the ground.

The basic principle of cloud seeding has been widely known since the 1950s. Recent studies suggest that under very specific conditions cloud seeding with silver iodide can increase rainfall by as much as 15 percent.

However, it is difficult to determine the effectiveness of cloud seeding. For one thing, there is always the question of how much it might have rained or snowed anyway, without the cloud seeding.

Needed: 42 Trillion Liters Of Water

Asked if this year's efforts worked, Don Griffith, who is president of North American Weather Consultants, says: “That's a very difficult question to answer.... We think so, we hope so, but there's no way you can demonstrate that.”

Others are more confident. "It's a proven program as far as we're concerned, and it's something we'll continue to do," Lee says. "Cloud seeding is just one of the efforts we employ to increase our local water supply."

California currently needs an extra 42 trillion liters of water to end its drought. Given that, any and all efforts may be needed.

You Need The Right Conditions

"We don't go out there and say we're drought relief," says Neil Brackin, president of the cloud seeding company Weather Modification Inc. "Sorry, can't happen. But as part of a comprehensive water management program, cloud seeding can be very effective."

However, cloud seeding can only work well under certain special conditions. Like snowflakes, no two clouds are the same. Part of the trick is having the right weather conditions and finding the right geographical situation. The silver iodide must also be inserted into the right spot in a cloud.

At the same time, cloud seeders must be careful not to seed monster storms. They also must be careful not to cause heavy rainfall in places where flooding could occur.

Mountains Near The Coast? Got It!

Many parts of California have mountains close to the coastline. Such geography makes it easier to find the specific conditions that are the only proven way to make cloud seeding work.

Specifically, storm clouds have to run into mountains that force the humid air upward. When humid air is pushed upward, bands of supercooled water vapor form. Such bands of vapor, which are not yet frozen, are the perfect setting for silver iodide particles to boost rainfall.

Few places are blessed with such a perfect setup. Perhaps that is why the United Arab Emirates is considering building a mountain in the desert and harvesting rain from clouds that run into the artificial peak.

Quiz

- 1 Read the paragraph from the section "Silver Iodide To Boost Rainfall."

Pasadena's latest efforts mark the first time since 2002 that the parched city has seeded clouds. It is currently enduring a nearly five-year-long drought with this winter's rainfall at just 40 percent of the usual amount.

Which of the following words could BEST replace the word "parched" in the paragraph without changing the meaning?

- (A) arid
- (B) barren
- (C) shriveled
- (D) scorched

- 2 Read the following sentence from the section "Faint Hope Is Better Than Nothing."

However, even the faint hope of wresting more water from the vast reservoir in the sky remains impossible to resist.

Which of the following options BEST describes the meaning of the word "wresting" as used in the sentence?

- (A) bringing to a halt
- (B) enforcing action
- (C) forcibly extracting
- (D) reinforcing support

- 3 Which of the following sentences from the article develops the idea that cloud seeding is not a new phenomenon?

- (A) Pasadena's latest efforts mark the first time since 2002 that the parched city has seeded clouds.
- (B) The Public Works Department has overseen cloud seeding efforts in the Los Angeles area for more than 50 years.
- (C) The department estimates that cloud seeding can generate 5.7 billion liters of extra water over an October to April season.
- (D) Recent studies suggest that under very specific conditions cloud seeding with silver iodide can increase rainfall by as much as 15 percent.

- 4 Why does the author include the section "Needed: 42 Trillion Liters Of Water"?
- (A) to show that there is much controversy over whether the cloud seeding efforts are worth the expense
 - (B) to outline the various responses to the cloud seeding method while implying that the efforts are likely useless
 - (C) to outline the seriousness of the drought problem in California and, while doing so, emphasize that cloud seeding is only minimally effective
 - (D) to show that even though there is disagreement over the effectiveness of cloud seeding, the situation warrants exploring every potential solution

Answer Key

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