

OPEN A POP BOTTLE

Want To Create Instant Snowstorms, Blizzards?

The opening of pop bottles causes snowstorms and blizzards of astonishing intensity, says a University of Arizona physicist.

Dr. James E. McDonald, senior physicist in the UA Institute of Atmospheric Physics, has found that a simple thing like a pop bottle can be a fascinating thing to study.

He is interested in them as test models of two very subtle ways that nature changes water.

The pressure in the neck of a pop bottle is three to four times that on the surface of the earth. The pop is put under pressure so that it will

hold carbon dioxide in solution.

The gas above the pop is supersaturated with water vapor.

Meteorologists define severe blizzards as situations where there are winds of 45 miles per hour and temperatures colder than 10 degrees F.

But the storm started with the opening of a pop bottle cap are much greater.

Winds rush out of the opening at sonic speeds of 600 miles an hour. And the temperature of the neck of the bottle drops in 20 to 30 thousandths of a second to minus 100 degrees F. from the expansion of the gas.

Over the Catalinas, it takes perhaps 15 minutes for the rising air to cool enough to condense. All of this is done in the pop bottle in hundredths of a second.

The colliding molecules of

water vapor build up into cloud droplets by a process known as homogeneous nucleation.

Then the molecules inside the droplets freeze into crystals and the whole particle finally becomes snow.

All of this is done in pure water without the foreign particles which form a nucleus for snow in real clouds.

If the pop has been refrigerated for an hour and a half, the snow storm following will cause another spectacular sight. When the first snow particle hits the surface of the pop, ice crystals begin to grow through the whole mass of liquid.

McDonald said that the storm takes place in all pop except orange and grape which don't have enough carbon dioxide.

He is trying to understand as much as possible about the pop blizzards so that they can be used as classroom illustrations of the natural processes.

"The thing that is astounding is that when you look at homely, every day things like pop bottles you find them fraught with complexity that you can't exhaust completely," McDonald said.

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