



1  
00:00:00,000 --> 00:00:03,330

It's not easy to see aerosols in Earth's atmosphere,

2  
00:00:03,350 --> 00:00:04,370

but they're there.

3  
00:00:04,390 --> 00:00:07,470

And NASA scientists say these tiny particles

4  
00:00:07,490 --> 00:00:08,870

are having a profound effect

5  
00:00:08,890 --> 00:00:12,200

on snowpack and spring climate in the Northern Hemisphere.

6  
00:00:12,220 --> 00:00:16,100

At any moment, millions of tons of aerosols lifted by winds

7  
00:00:16,120 --> 00:00:19,580

and generated by wildfires and the burning of fossil fuels

8  
00:00:19,600 --> 00:00:21,580

are traveling across the globe.

9  
00:00:21,600 --> 00:00:23,240

In snow-covered regions,

10  
00:00:23,260 --> 00:00:26,500

certain kinds of aerosols can darken the snow and ice

11  
00:00:26,520 --> 00:00:30,630

causing it to absorb more of the sun's energy and melt faster.

12  
00:00:30,650 --> 00:00:33,890

Scientists call this phenomenon the snow darkening effect.

13  
00:00:33,910 --> 00:00:37,600

The snow darkening effect is basically another way of saying

14

00:00:37,620 --> 00:00:40,130

what happens when snow gets "dirty."

15

00:00:40,150 --> 00:00:42,730

Snow that has become darkened by aerosols

16

00:00:42,750 --> 00:00:46,140

absorbs more sunlight, than snow that is pristine.

17

00:00:46,160 --> 00:00:47,880

This may not seem significant,

18

00:00:47,900 --> 00:00:50,470

but it can actually have a big effect

19

00:00:50,490 --> 00:00:52,670

on the melting during spring.

20

00:00:52,690 --> 00:00:54,730

Using a NASA climate model,

21

00:00:54,750 --> 00:00:58,310

researchers studied the impact of three types of aerosols

22

00:00:58,330 --> 00:01:01,310

on snowpack in the Northern Hemisphere spring,

23

00:01:01,330 --> 00:01:04,670

specifically dust, black carbon, and organic carbon.

24

00:01:04,690 --> 00:01:07,380

The areas colored red to purple on this map

25

00:01:07,400 --> 00:01:10,640

show where the surface absorbed more energy from the sun

26

00:01:10,660 --> 00:01:14,170

due to snow that has become darkened by these aerosols.

27

00:01:14,190 --> 00:01:16,270

This surface warming resulted in

28

00:01:16,290 --> 00:01:18,360

reduced amounts of snow in spring,

29

00:01:18,380 --> 00:01:20,780

shown here in areas colored blue.

30

00:01:20,800 --> 00:01:25,270

These reductions might reflect an earlier melting of winter snowpack

31

00:01:25,290 --> 00:01:28,840

and ground warming of areas normally covered by snow.

32

00:01:28,860 --> 00:01:30,150

In some places,

33

00:01:30,170 --> 00:01:33,260

temperatures are up to about 10 degrees Fahrenheit warmer

34

00:01:33,280 --> 00:01:35,950

than it would be if the snow were pristine.

35

00:01:35,970 --> 00:01:39,320

As we add more of these aerosols to the mix,