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# Wildfire shifts could dump more ice-melting soot in Arctic

In some areas, black carbon emissions from blazes will double, simulations predict

BY THOMAS SUMNER 6:00AM, APRIL 18, 2016



**FIRE STARTER** Wildfires will spew more soot into the air in many regions by the end of the century, new research predicts. That soot could darken Arctic ice and accelerate melting.

MIKE MCMILLAN/U.S. FOREST SERVICE

Raging wildfires could burn away efforts to reduce Arctic-damaging soot emissions. Soot produced by burning fossil fuels and plants, also called black carbon, can cause respiratory diseases and greenhouse warming, and can accelerate the melting of ice.

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Rising temperatures and changing weather patterns will shift where and how fiercely wildfires burn and spew soot, new simulations show. Outside of the tropics, fire seasons will last on average one to three months longer during the 2090s than they do currently, researchers report online April 8 in the *Journal of Geophysical Research: Atmospheres*. Soot emissions from wildfires will as much as double in regions that border the Arctic and counteract projected reductions in soot from human activities, the researchers predict.

"Humankind would do well to proactively develop adequate land and fire management strategies to have at least some control on future wildfire emissions," says study coauthor Andreas Veira, an earth system scientist at the Max Planck Institute for Meteorology in Hamburg.

Predicting the future of fires is difficult because many factors — from weather to vegetation — influence wildfires. Veira and colleagues strung together three different computer simulations that projected the impact of climate change on wildfires (*SN Online: 7/15/15*). The first predicted future changes in global vegetation, which fed into the second, a wildfire simulation called SPITFIRE. Finally, the researchers plugged their predicted fires into a climate simulation.

If carbon emissions aren't cut, overall soot emissions from wildfires will stay fairly steady but shift in location. Outside of the tropics, wildfire soot emissions will increase 49 percent by the end of the century as fire seasons get longer, the researchers predict. In the tropics, changing land usage and fewer human-caused ignitions due to urbanization will help decrease emissions there by 37 percent.

A northward shift in wildfires will push more soot emissions toward the Arctic, the researchers warn. Fallen soot darkens ice and snow, accelerating melting (*SN: 10/5/13, p. 26*). A 2009 study estimated that soot was responsible for more than a third of Arctic warming between 1976 and 2007. The new simulations show that about 53 percent more soot will fall on the Arctic at the end of the century, even if humans cut their own soot emissions in half.

Many factors that could influence future wildfires remain uncertain, says atmospheric scientist Shane Murphy of the University of Wyoming in Laramie. "We shouldn't take the absolute numbers to mean too much, just to inform us that there's the potential for severe consequences."

## Citations

A. Veira, G. Lasslop and S. Kloster. Wildfires in a warmer climate: Emission fluxes, emission heights, and black carbon concentrations in 2090–2099. *Journal of Geophysical Research: Atmospheres*. Published online April 8, 2016. doi: 10.1002/2015JD024142.

## Further Reading

T. Sumner. Dome effect leaves Chinese megacities under thick haze. *Science News*. Vol. 189, April 16, 2016, p. 5.

T. Sumner. Wildfire seasons have gotten almost 20 percent longer. Science News Online, July 15, 2015.

C. Samoray. Parched parts of Earth expanding. *Science News*. Vol. 188, December 12, 2015, p. 5.

B. Mole. Forest fires may speed demise of Greenland's ice sheet. Science News Online, May 19, 2014.

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**Oliver Draeger** · a day ago

I always wonder how nature did get along for five billion years without mankind managing this and proactively doing that. It would be interesting to compare the extent of the predicted soot emissions with the dust emissions from the Tambora eruption prior to the so-called "year without summer" 1816. Is there any explanation why the latter caused climate to cool down profoundly, whereas man-made soot emissions "can cause greenhouse warming" ? Is it because everything man does is supposedly evil and outside of nature ?

An interesting conclusion of the article is, that we should not take the absolute numbers too seriously (the admission of which is definitely to the authors' credit of course), but "just to inform us that there's the potential for severe consequences". In other words, "we don't know much, but we know that everything could get worse". What I am missing a little bit in these times where depressive disorder seems pandemic, are investigations of potential for beneficial consequences. Aren't there any ? Hardly believable. Experience shows that if you're unable to see your opportunities, others will take advantage of them.

One thing I always appreciate to read is that "predicting the future is difficult" because that is very much congruent with my own experience, especially when it comes to the simulation-only business.

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**Rycke Brown** → Oliver Draeger · a day ago

One upside to wildfires that I have observed in Southern Oregon is that plants love forest fires as long as they aren't the ones burning. More CO2, water vapor released from cellulose; and ash fertilizer. Trees grow more beautifully the following year. The smoke also lowers temperatures and filters our strong sunlight. A couple years ago, a big forest fire put itself out when a center or circulation came in and made the water vapor precipitate out in a huge thunderstorm that dropped over an inch of rain in 24 hours.

But that storm was just a little taste of what happened in the '80s, when we in Oregon were irrigating full strength, almost all farms producing, nearly all city properties watered and mowed, before water rates were raised and when we were just beginning to be told that we need to save water by the environmentalists, who were also starting to talk about global warming. We had wet thunderstorms nearly every week in the summer, with bigger rain events in July and August than in June and September. Medford to the east had more rain than Grants Pass, and Klamath Falls, further uphill and downwind, had more rain than Medford. We made rain from our irrigation, not our forest fires.

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**Barbara Thompson** → Rycke Brown · 16 hours ago

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