Wildfire is known to have a dramatic impact on soil, but do soil conditions also affect wildfire? A new study says yes, and the finding could lead to better predictions of wildfire danger.

The research, which appears in the November–December 2015 issue of Soil Science Society of America Journal, aimed to address a simple but understudied question, says Oklahoma State University (OSU) soil scientist and lead author, Erik Krueger: “Is soil moisture related to wildfire?”

When the scientists crunched the numbers, they found that 91% of Oklahoma’s largest fires during the growing season broke out only when soil moisture dropped below levels that cause plants severe stress.

The link between fire and soil moisture may seem obvious, says Krueger, who led the study with SSSA member Tyson Ochsner, an OSU soil physicist. But to the team’s knowledge, a direct connection hasn’t been made until now because the soil moisture data “just weren’t there to do it.”

What made this study possible was a comprehensive, soil moisture monitoring network, known as the Oklahoma Mesonet, along with a wildfire dataset compiled by the Oklahoma State Fire Marshal’s Office.

Now that the relationship has been established, wildfire scientists can test whether soil moisture data improve fire risk assessments in Oklahoma, where thousands of wildfires erupt each year. The new information should be especially valuable during the growing season, when the water held inside living vegetation makes it harder to predict fire danger from weather conditions alone.

But Krueger and his colleagues also hope scientists far beyond Oklahoma will take note of the work. And, in fact, the team is already asking how its results may apply in other wildfire-prone regions, such as those dominated by forests.

“Wildfire scientists are very conditioned, with good reason, to think about things like wind speed, for example. Low relative humidity...”

DOI: 10.2134/csa2015-60-12-2

Is Soil Moisture Related to Wildfire? by Madeline Fisher

Published December 3, 2015