



National Weather Center
University of Oklahoma

FIRE

RADAR, MODELING, & MESSAGING



Wildfires cause billions of dollars in damage in the United States each year. CIWRO researchers have been contributing to fire weather science to save lives and property through advancements in radar technology, short-term high-resolution modeling, and social science research. On March 14, 2025, all three mitigation efforts coalesced to save lives and property against sweeping wildfires in central Oklahoma.

CIWRO is at the forefront of developing new high-resolution forecast tools for fire weather impacts, like the Warn-on-Forecast

System. On March 14, National Weather Service forecasters issued fire warnings based on WoFS-Smoke forecasts of dry air and strong winds. WoFS-Smoke identified potential timing of wind shifts, and subsequent changes in humidity that proved important for communicating to responders in the field and at the Oklahoma Emergency Operations Center.

WoFS-Smoke helps give emergency managers advanced notice of dangerous fire behavior – such as rapid growth, flare-ups, or shifts in direction, offering life-saving lead time for evacuations and resource planning.



STORM RADAR ANALYZES FIRE

During the wildfire outbreak March 14, the Advanced Technology Demonstrator radar scanned the fire plumes around central Oklahoma. CIWRO and NSSL researchers sampled plumes from 18 fires every 70 seconds. Researchers utilized ATD's unique ability to assess the size, shape, concentration, and homogeneity of scanned particles. Typically used for investigating precipitation within storms, the ATD was leveraged to gain a better understanding of the micro-physical characteristics of the smoke particles much faster and in ways impossible for current radar.

150

people attended the CIWRO Fire Weather Meeting in 2025

41

fire warnings issued by the NWS during the March 14-15 outbreak

86

Oklahoma EMs and first responders contributing to CIWRO fire surveys

6

hours into the future that WoFS-Smoke can predict high-res fire conditions

EMPOWERING COMMUNITIES

In 2023, CIWRO Social Science Research Team members began working to better understand how emergency managers, first responders, and professional meteorologists use fire weather forecast information for preparedness and response to wildfires. Through a combination of surveys and post-event interviews, CIWRO researchers have shared insights for effective fire weather messaging with NWS meteorologists and Oklahoma public safety officials. In 2025, CIWRO hosted and facilitated Oklahoma's first statewide fire-weather-focused meeting, bringing together fire officials, emergency managers, meteorologists, and researchers to discuss current practices and explore new methods for communicating fire danger to the public. CIWRO social scientists were in the NWS Norman forecast office March 14, collaborating with forecasters and fire officials from the Oklahoma Forestry Service to support real-time operations.



The UNIVERSITY of OKLAHOMA