2021 Fire Symposium Abstract

Observational and Numerical Studies of the Camp Fire (2018) in Northern California

Justin Riley, Mike Kaplan, and Yuh-Lang Lin

The Camp Fire (2018) was considered one of the deadliest and most destructive wildfires in the state of California's history. Early on November 8, 2018, hot katabatic winds known as Diablo winds moved through interior Northern California just before fires were ignited under a power transmission line near the Poe Dam. The fire caused over 80 civilian fatalities and 12 additional injuries. The fire covered an area of 153,336 acres and destroyed over 18,000 structures in the first four hours of the ignition of the fire. Also, towns like Paradise and Concow were almost destroyed losing over 90% of their structures. By January 2019, the estimated total damage caused by the fire was close to $16.5 billion. This study will analyze the precursor mesoscale environment leading up to the beginning of the fire. One of the important factors to be focused on is how the local terrain enhanced the precursor environment for erratic Diablo winds before the fire ignited. In order to answer this and other questions, an analysis of the observational data will be performed to study the environment of the fire before, during and after to understand the dynamics of the larger scale atmosphere during the fire's entire evolution. Different fire indices such as the Haines index and the Hot-Dry-Windy index will be also investigated to determine their predictive sensitivity for this fire. Additionally, WRF sensitivity simulations of the role of differing local terrain configurations will be analyzed to enhance our understanding the role of complex terrain in the erratic winds. This project is part of a large fire project that inter compares four historical fires (three in California and one in Arizona) from a multi-scale perspective, i.e., synoptic to fire-front scales of motion.