

## **Reconstructing fire intensity leveraging infrared imaging microscopy of charcoal materials and NASA remote sensing products**

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Fires in the western United States have been increasing in size and frequency over recent decades providing challenges for ecosystem management. Researchers and managers are increasingly concerned on how to prepare for a future with extreme fire behavior. However, by studying historical fire regimes more effective management practices can be adopted. Utilizing a suite of technologies such as NASA remote sensing products in conjunction with laboratory and field components will help identify combustion temperatures of charcoal from wildfire.

Charcoal was produced in a laboratory from various species found in the mixed-conifer forests of the western United States. Using a muffle furnace, samples were combusted at temperatures ranging from 200-800°C (in 100°C increments) and ground to a size fraction <53 microns separated by species and temperature. This smaller fraction was run on a Fourier transformed infrared spectroscopy microscope to try to identify differences in samples and create a reference library for future work. With this reference library we hope to be able to identify temperature and species from charcoal collected in prescribed burns or wildfires, and later to lake cores and charcoal from tree burn scars. This additional temperature data can elucidate past fire behavior and provides context into burn severity and associated ecological effects.