

Application of a rapid deployment flame measurement package

M.G. Cruz^{1,2}, J.S. Gould^{1,2}

- 1. Bushfire Dynamics and Applications, CSIRO Sustainable Ecosystems, ACT
- 2. Safe Prevention, Preparation and Suppression, Bushfire Cooperative Research Centre, VIC

Introduction:

Identifying a need to conduct better measurements of flame front properties in bushfires led to the design and development of a rapid-deployment package to measure heat fluxes, fluid flow velocities and radiation characteristics in bushfire flames.

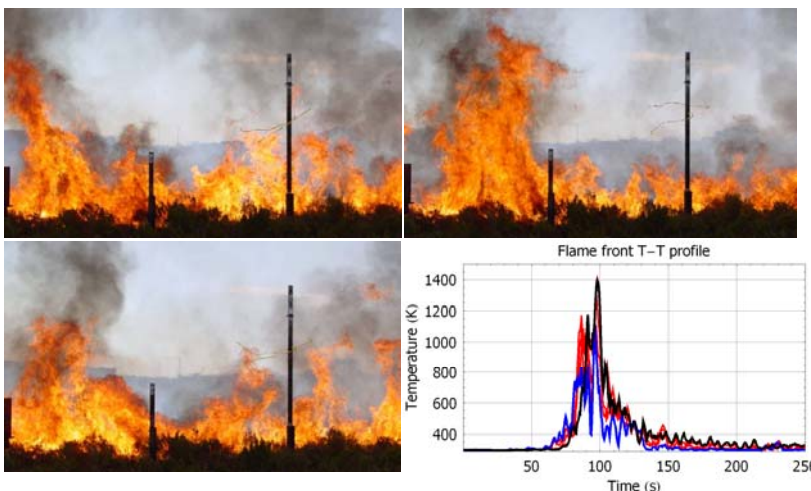
Challenge:

To develop a multi-sensor measurement package that would be light enough to allow rapid deployment on short notice and yet robust enough to survive the extreme environment that characterizes high intensity fires. These characteristics allow the sensors to be used in prescribed burns and wildfires.



Setup and post-fire view of instrument towers.

Results:



Flame temperatures, flame radiation, flow velocities, and convective and radiative heat fluxes within flames were measured during moderate and high intensity field experiments in mallee-heath fuel complexes.

These flame-front measurements were then used to set the base data from which physical-based modeling frameworks can be developed to build the next generation of fire behaviour models.

Detail of turbulent flame structure (above) and measured flame time - temperatures (T-T) curves during a moderate intensity shrub fire.

In-Fire video stills (below) from a crown fire passing through heat flux measurement towers.

