

Effects of wildland fuel moisture content on radiant heat flux emitted by a laminar non-premixed flame

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Abstract

This work addresses the effect of wildland fuel moisture content on flame radiation. A wildland fuel layer composed of *Pinus radiata* needles was experimentally studied using a specially designed burner, which produced small bench-scale laminar, non-premixed flames. These flames were suitable for the study of their emitted radiation providing stable, repeatable and axisymmetric flames. Pine needles were dried and then rehydrated to obtain four different moisture contents. The radiant fraction was estimated as the ratio between the radiant emission from the flame and its heat release rate. The radiant emission was determined with measurements from a radiometer and image analysis of the flame shape in order to estimate the view factor between the flame and the radiometer. The mass loss rate was measured to determine the heat release rate from the flame. This study confirms the decrease in radiant emission by increasing fuel moisture content. Also, the results indicate a small variation in the radiant fraction, despite the clear variations observed in flame shape and mass loss. Additionally, correlations between results were determined with the purpose of characterizing the effect of moisture content on the radiant fraction.

Palabras clave

Palabras clave de autor: [Wildland fuel](#); [Moisture content](#); [View factor](#); [Radiant fraction](#)

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