PREVIEW
EGU General Assembly 2025

Mapping fuel models across continental Chile

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The vast latitudinal extent of continental Chile (approximately 17° to 55° South), combined with its contrasting anthropogenic land-use patterns and diverse altitudinal configurations, presents significant challenges for understanding fuel configurations. This study aims to define standard fuel models, based on the Scott and Burgan classification, to support stochastic wildfire spread simulations at the landscape scale.

In terms of landscape regions associated with forested or woody vegetation areas, three main regional units can be broadly identified. In the north (17°-30°), forest cover is sporadic or absent. In the center (30°-41°), the landscape is dominated by monoculture plantations of *Pinus radiata* and *Eucalyptus globulus*. In the south (41°-55°), extensive native forests prevail, with minimal or no human intervention.

The central Mediterranean zone presents the greatest challenge for defining fuel models, as this region has experienced the highest wildfire occurrence and damage levels in recent decades. Notably, two “firestorms” in 2017 and 2023 burned more than 900,000 hectares combined. In this area, forest monocultures undergo significant temporal changes due to both exploitation and wildfire impacts. Additionally, the lack of official data complicates the estimation of forest monoculture biomass and vertical structure, requiring the use of ancillary datasets to improve estimates of canopy structure and vegetation conditions.

In this study, fuel models were mapped across continental Chile producing a 100-meter resolution raster dataset standardized according to the Scott and Burgan methodology. The Vegetation Resources Cadaster produced by CONAF served as the foundational dataset, adapted and updated for fuel class assignments, with further refinements made by incorporating remote-sensed products such as canopy height data.