# Fire Mitigation in the European Alps: North American Danger Assessment Models for Use in Differing Climates

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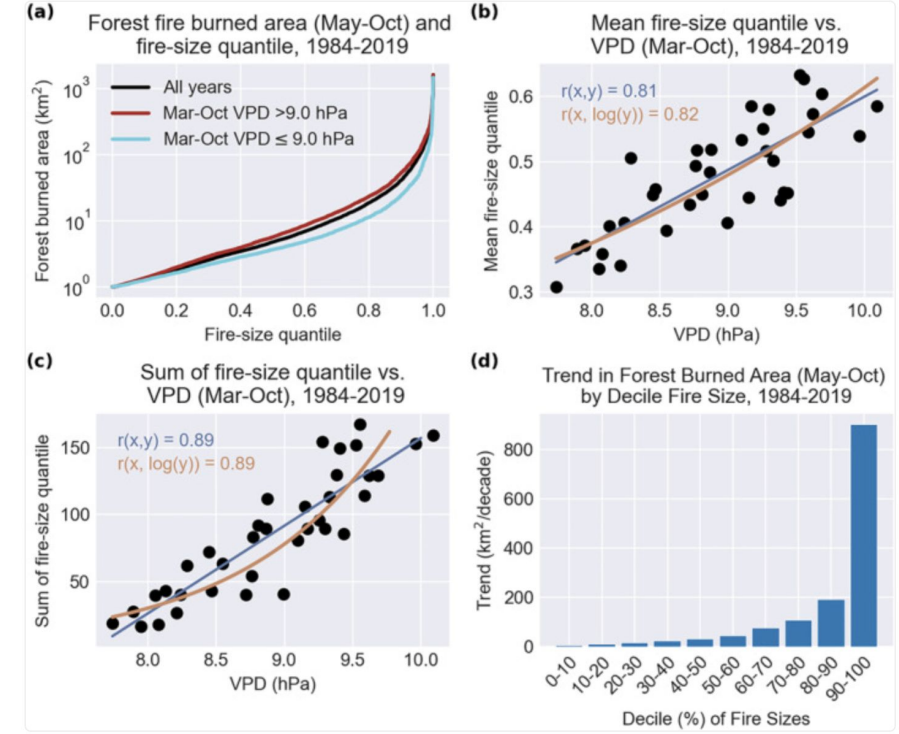
# Background

**Wildfire increase: Frequency and intensity**

- North America - past 20 years
- Europe - Past 5 years

**Why?**

- Climate change
- Higher temperatures
- Altered precipitation patterns



# Background

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- Europe - Past 5 years

**Why?**

- Climate change
  - Higher temperatures →
  - Altered precipitation patterns →

**Longer fire season!**

# Research Question

**Using danger assessment models from North American fire ecology, how can land managers adapt those models for use in the European Alps with the growing threat of wildfires?**

# Methods

- **Identify existing danger assessment models used in North America and current DAMs used in Europe**
- **Regional Differences**
  - Precipitation
  - Geography
  - Ecosystem Composition
- **Model adaptations**
- **How mitigation strategies affect DAM scores**
- **How post-disaster recovery efforts affect future DAM scores**

# Fire Danger Assessment Models (DAMs)

**North America: CFFDRS and NFDRS**

- Canadian Forest Fire Danger Rating System

**FBP –** Fire Behavior System

**FWI** – Fire Weather Index

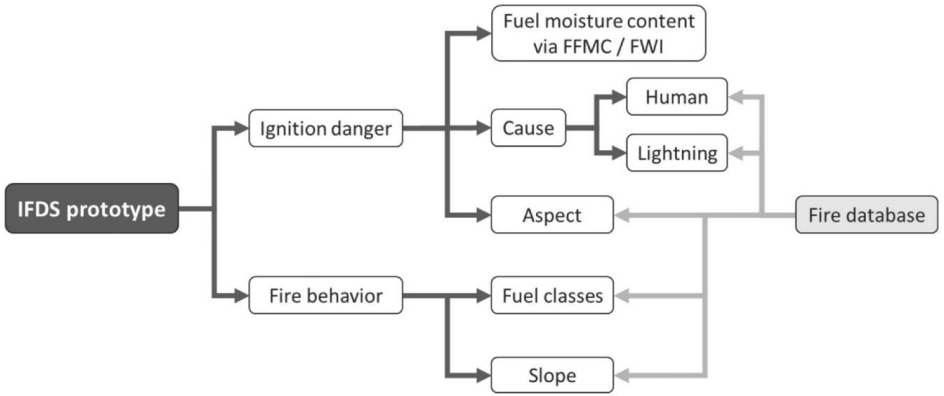
**FOP** – Fire Occurence Prediction

- National Fire Danger Rating System

**Europe: IFDS**

- Integrated Forest Fire Danger assessment System

**FWI (from CFFDRS)**



# Regional Differences

**Precipitation**

**Geography**

**Ecosystem Composition**

**North America Ranges:**

550mm - 1880mm

**European Alps:**

1500mm - 2000mm

- Precipitation type change

**Adaptation:**

- Recalibration of moisture codes/drought indices **IFDS**
- Dynamics of snowpack accumulation and melt timing → seasonal fuel availability and moisture status **IFDS**

# Regional Differences

**Precipitation**

**Geography**

**Ecosystem Composition**

**North American Ranges:**

Lower slope degree → slower rate of spread

Slope aspect → minimal impact

**European Alps:**

Higher slope degree → faster rate of spread

Slope aspect → affects fire season length

**Adaptation:**

- Recalibration of slope degree to be weighed appropriately for use in **IFDS**
- Inclusion slope aspect

# Regional Differences

**Precipitation**

**Geography**

**Ecosystem Composition**

**North American Ranges:**

- Natural fire frequency → Homogeneous, fire-adapted coniferous forests
- More flammable

**European Alps:**

- Long history of management → mosaic of forests
- Less flammable

**Adaptations:**

- Shift in DAM fuel classification systems

# Mitigation Effects on DAMs

**Pre-fire mitigation:**

- Reduce risk, intensity, and spread
- Strategic use of resources, fuel breaks, thinning, etc.

**Effect on DAMs:**

- Lowers baseline risk score

# Post-Disaster Recovery

**Regenerating vegetation influences future fire probability**

- Change in fuel moisture dynamics
- Reduced canopy cover
- Microclimate shift
- Soil moisture retention decline

**Facilitates more aggressive fire behavior**

**Effect on DAMs:**

- Necessitates awareness
- Incorporation of dynamic fuel changes post-fire to improve accuracy

# Summary

**In order to adapt North American DAMs for use in Euopean Alps…**

- **Address regional Differences between NA and EU within IFDS model**
- **Fire mitigation strategies reduce DAM score**
- **Incorporate dynamic post-disaster recovery processes**

# Thank you!

## Questions?