Characterizing dichotomous fire regimes of southern California: climate, vegetation, and topography

Crystal A. Kolden
John T. Abatzoglou
University of Idaho
Department of Geography
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Fire in Mediterranean Ecosystems

Mediterranean ecosystems:
• 2% of land surface
• 6% of world population
• 20% of global floristic spp.

Southern California:
• Extensive urban interface
• Episodic, large fires
• Katabatic winds
Recent Large Fires

Day Fire 2006

Station Fire 2009

Zaca Fire 2007
Drivers of Fire Regimes

Do Santa Ana wind-driven fires dominate?

• Fire behavior triangle → drivers
• Climate relationships previously explored by Keeley (2004)

Data:
• CalFire (>40ha) 1948-2009
• MTBS (>404ha) 1984-2010
• LANDFIRE
• Santa Ana event chronology (Abatzoglou and Barbero, 2013)
• PRISM
• Gridded surface meteorology (Livneh et al. 2013)
56% NSA area burned
Temporal Distribution – 1948-2009
Environmental Factors (1948-2009)
Years SA fires exceed 50K ha

No correlation between SA and NSA annual area burned
Antecedent Climate (1948-2009)

Correlation coefficients \((r^2)\) of climate variable to log area burned

Only significant relationships shown
Climate Change and Implications

1. Future fire activity
   - Santa Ana events $\rightarrow$ uncertainty
   - NSA forest fires $\rightarrow$ increasing, earlier
     - Antecedent conditioning of fuels
     - Drier spring, warmer spring/summer

2. Implications
   - Fuels management
   - Research
Questions?

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