Geophysical Research Abstracts
Vol. 20, EGU2018-11857, 2018
EGU General Assembly 2018
© Author(s) 2018. CC Attribution 4.0 license.

Climate-vegetation-wildfire interactions in the western United States

A. LeRoy Westerling

University of California, Merced, School of Engineering, Management of Complex Systems, United States (leroy.westerling@icloud.com)

In the arid western US, considerable biomass is concentrated in montane forests, where orographic effects and lower temperatures favor winter snow accumulation. Warming and more variable precipitation are fostering more frequent and severe drought, earlier snowmelt, and greater climatic extremes, extending fire seasons and increasing the frequency, size and severity of large forest wildfires. While large forest wildfire frequencies are regionally sensitive to timing of spring snowmelt, western US forests exhibit diverse responses to warming. Forests with historic mean snow-free periods of approximately two to four months and high cumulative spring and summer AET have been most sensitive to changes in spring timing. Mid-elevation forests in the US Rocky Mountains and the Sierra Nevada have had the largest forest areas with the most drying associated with early spring snowmelt timing compared with late spring snowmelt timing since the mid-1980s, and show the greatest increases in large-fire frequency from early to late snowmelt seasons. Wildfire frequency and burned area in Pacific Northwest forests have increased more rapidly, albeit from a low base, in the most recent two decades. Total and high severity burned areas have been significantly greater during recent droughts, with drought severity associated with increased incidence of temperature and precipitation extremes. Fire suppression and land use changes have also contributed to increased fire size and severity in parts of the region, particularly the US Southwest and Sierra Nevada, increasing the vulnerability of some forests to climate change. Projected changes in forest vegetation and wildfire indicate that continued warming may similarly elicit diverse responses in regional forests, within a regional trend towards increasing fire activity that could be partially ameliorated by strategic fuels management.