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Vegetation disturbance and erosion after fire: Interactions of severity, climate, topography, and soils

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Fire has been used by humans as a tool for manipulating vegetation for millennia. These fires have profoundly affected the vegetation component of ecosystems but have also affected soil formation and erosional processes. The interactions of fire severity, climate, topography, and soil systems have produced a wide array of responses and degrees of erosion. Fire has been part of many ecosystems since the Carboniferous, but humans have taken fire frequency and impacts to a new level. One result has been a global increase in desertification and degradation of soils. Erosional of soils contributed to the decline of past civilizations and now raises a new specter due to climate change and burgeoning human populations. This paper examines the interactions of vegetation, fire regime, fire severity, climate, topography, parent material, and soil erosion on long-term soil sustainability in the 21st Century.