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# Wildfire contribution to world-wide desertification.

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Wildfire is a natural phenomenon that began with the development of terrestrial vegetation in a lightning-filled atmosphere. Sediments from the Carboniferous Period (307-359 million years before the present) contain evidence of charcoal from post-fire ash slurry flows. As human populations developed in the Pleistocene and Holocene epochs, mankind transformed fire into one of its oldest tools. Human and natural ignited fires from lightning altered and steered the trajectories of ecosystem development in most parts of the world. Humans are now the primary source of forest and grass fire ignitions throughout the world. As human populations have increased and industrialized in the past two centuries, fire ignitions and burned areas have increased due to both sheer numbers of people and anthropogenic changes in the global climate. Recent scientific findings have bolstered the hypothesis that climate change is resulting in fire seasons starting earlier, lasting longer, burning greater areas, and being more severe Computer models point to the Western U.S., Mediterranean nations and Brazil as "hot spots" that will get extremes at their worst. The climatic change to drier and warmer conditions has the potential to aggravate wildfire conditions, resulting in burning over longer seasons, larger areas of vegetation conflagration, and higher fire severities. Wildfire is now driving desertification in some of the forest lands in the western United States. The areas of wildfire in the Southwest USA have increased dramatically in the past two decades from <10,000 ha yr-1 in the early 20th Century to over 230,000 ha yr-1 in the first decade of the 21st Century. Individual wildfires are now larger and produce higher severity burns than in the past. A combination of natural drought, climate change, excessive fuel loads, and increased ignition sources have produced the perfect conditions for fire-induced desertification. Portugal suffered the worst and second worst wildfire seasons in a three-year period (2003 – 2005). In 2005, 338,262 ha of forest land burned. This was a 77% increase over the 10-year burn average of 189,500 ha. Desertification is about the loss of the land's proper hydrologic function, biological productivity, and other ecosystem services as a result of human activities and climate change. It affects one third of the earth's surface and over a billion people. In the past, desertification was considered a problem of only arid, semi-arid, and dry sub-humid areas. However, humid zones can undergo desertification with the wrong combination of human impacts. The Amazon region is an example of where forest harvesting, shifting cut and burn agriculture, and large-scale grazing are producing desertification of a tropical rain forest on a large scale. Some of the environmental consequences of wildfires are vegetation destruction, plant species and type shifts, exotic plant invasions, wildlife habitat destruction, soil erosion, floods, watershed function decline, water supply disruption, and air pollution. All of these are immediate impacts. Some impacts will persist beyond the careers and lifetimes of individuals. Small, isolated areas do not produce noticeable desertification. But, the cumulative effect of multiple, large area, and adjacent fires can be landscape-level desertification. This paper examines wildfire contributions to desertification in regions of the world that are prone to wildfire and climate change.