

Fires and Society: Connections to Air Quality, Public Health, and Land Use and Management

Excerpts from India, Equatorial Asia, and North America



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[Zoom Link](#) (Mixed-mode)

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Fire is an essential Earth system process with unique human influences through land use and management and multifaceted impacts on planetary health. Under climate warming, we must navigate severe fire seasons and grapple with the modern human-fire relationship through the lens of air quality and public health, policy and human livelihoods, ecosystems, and the global carbon budget. Here I discuss the current state of advances and challenges with three excerpts from India, Equatorial Asia, and North America. In north India, farmers set post-harvest fires to quickly and cheaply clear crop residues and prepare fields for the next crop. I showed how delays in post-monsoon agricultural fires, coupled with increasing rice production, have exacerbated regional air pollution, an inadvertent consequence, in part, of a policy designed to alleviate groundwater shortages by shifting rice planting closer to monsoon rains. In Indonesia, forest fires are associated with deforestation and palm oil production; the severity of the fire season is closely tied to large-scale climate patterns, which manifests in escaped peat fires during drought years. I implemented a framework with land use change, fire emissions, and atmospheric transport components to quantify the public health impacts, as well as potential benefits from future land management scenarios. In North America, recent fire seasons include extreme wildfires, stemming from hot and dry conditions, fuel build-up from a legacy of fire suppression, and a growing wildland-urban interface. I developed an algorithm using geostationary satellite data to map large wildfire progression at hourly intervals, which resolves periods of extreme fire spread. I then investigated the influence of weather, topography, and suppression on wildfire growth and structure loss. Looking ahead, I aim to integrate the next generation of satellite data to improve fire tracking, prediction, and emissions inventories, model the sensitivity of fires to new climate extremes, and dissect fire-related impacts and opportunities for mitigation.



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