Mojitaba Sadegh

Increasing wildfire risks in a warming climate

Abstract: Climate extremes are increasingly disrupting human lives and societal services. Only in 2021, the US was impacted by 20 billion-dollar climate/weather disasters, which claimed 688 lives and imposed $145 billion in damages. In this talk, I will discuss how feedbacks between extremes and human response drive societal risks, mainly in the context of wildfires. I adopt a new definition that includes hazards, vulnerability, exposure and human response as the four pillars of risk. First, I will focus on hazards, and discuss how increasing trends in drought and extreme heat events and their concurrence amplified the frequency of disastrous wildfire seasons. This entails examining how land-atmosphere feedbacks compounded the background warming to not only intensify concurrent dry-hot extremes but also expand their geographical area of impact across the US. I will also review trends in dry-hot-windy conditions that are a recipe for disastrous wildfires. Second, I will focus on exposure, and present historical trends in human and infrastructure exposure to wildfires in the US, showing that impactful wildfires in terms of exposed population, road, and electric power transmission lines per unit burned area is increasing across the nation. Third, I will focus on vulnerability, and discuss trends in low-frequency and unprecedented extremes that surprise ecological and societal systems and leave lasting scars. I will also briefly touch upon climate justice and equity issues. Finally, and importantly, I will focus on human response to extremes, and present my vision for future research on co-evolution of human and Earth systems.

Bio: *Mojtaba (Moji) Sadegh* is an assistant professor of Civil Engineering at Boise State. He is a civil and environmental engineer by training and a climatologist by passion. Moji received his PhD in Civil and Environmental Engineering from the University of California, Irvine in 2015, and his BS and MS degrees in the same field in 2007 and 2010. He is enthusiastic about learning how Earth functions and how climatic changes shape the future of Earth and its inhabitants. Moji is passionate about increasing the resilience of natural, built and societal infrastructure to escalating climate/weather extremes. His research interests encompass a broad range of hydroclimate extremes, including multi-hazard events, droughts, heatwaves, and specifically wildfires. He uses geospatial analysis, machine learning, statistical methods and data fusion/integration techniques, as well as satellite and airborne imagery and products, climate reanalysis data, gridded and in situ observations, and socioeconomic data to unravel mechanisms that drive climate extremes and their societal impacts.