Predicting Wildfire Severity through Index on a Global-Scale Based on Abiotic, Biotic, and Human Factors

GRG 460G Final Project

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Abstract

With worsening global climate conditions and growing demands for agriculture and urban development, wildfires have become an increasing concern, especially where environmental and human factors overlap. Wildfire intensity and formation depend on several key factors, including land moisture, vegetation coverage, and human land use. Understanding wildfire vulnerability is crucial in areas where unique ecosystems meet human development, such as Stengl Lost Pines, Texas, and the Amazon. Fortunately, wildfires present a higher opportunity for prevention, as they often follow predictable patterns based on rainfall, vegetation, fire history, and industrial activities like agriculture and cattle farming. Analyzing data on abiotic, biotic, and human factors that constitutes opportunities for wildfire occurrences using ArcGIS and spatial analysis tools indicate that modern wildfires that can induce considerable damage on human communities or areas of interests are human-originated propagated by increasingly prominent human settlement patterns and travel networks in addition to climate patterns and abiotic such as past wildfire trends. With accelerating climate change caused by human activities, accompanied deteriorating soil and abiotic factors, and urbanization, the use of similar wildfire risk index maps provide hints into key areas of interest for pre-emptive wildfire deterrent and damage mitigation efforts.