



The impacts of climate change on forest fire occurrence in Canada

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There has been considerable study of the general impacts of climate change on the circumpolar boreal forest, and in particular on potential changes in the level of forest fire activity. Numerous studies, using a number of General Circulation Model (GCM) scenarios, have shown that fire danger levels will increase considerably in the 21st Century. In this study, using Poisson regression, we developed models of the expected daily number of both human- and lightning-caused fires for each of the forested ecoregions of Canada (an area of roughly 350 M ha) with fire occurrence and fire weather datasets obtained from each of the individual forest fire management agencies in the country. We then use these models with a recent scenario of future fire climate from the Canadian Climate Centre GCM to generate spatially detailed future fire occurrence scenarios for Canada. Results show considerable variation throughout the country, with central Canada showing the most significant increases. Overall, Canada wide fire occurrence was shown to increase by 80% by the end of the 21st Century, with the number of lightning fires doubling. This increase in lightning fire activity is critically important as it is lightning fires, and their occurrence in clusters and in remote locations, that can overwhelm a fire agencies suppression capacity leading to multiple escapes and larger areas burned. The impact of these large increases in forest fire occurrence on fire management in Canada will be discussed.