



The occurrence of widespread forest fires in Finland

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The Finnish forest fire season extends from May to September. The weather conditions vary from year to year, and drought occasionally increases the risk of large-scale forest fires. The recent examples of a widespread forest fires that occurred in conditions comparable to the Finnish climate was the fire in Västmanland in central Sweden in 2014 and again the widespread fires in Sweden summer 2018. In spite of a good early warning and fire-extinguishing system, we cannot definitely say that a major fire could never take place in Finland. Climate change may require new measures to adapt to extreme weather conditions. The objective of this study is to examine the probability of weather conditions favouring the occurrence of devastating forest fires in Finland.

We have applied forest fire indexes (FWI, FFI and crown-fire index) to estimate the return periods of the most extreme and severest risk conditions. As input data, we used meteorological observations from four locations for the period 1971–2014. As well, we used ERA-Interim and ERA-20C reanalysis data. The impact of climate change on the probability of large-scale fires was estimated on the basis of climate model simulations. The weather conditions associated with the large (over 200 ha) fires that occurred during the previous decades were studied using weather observations from nearby stations. In addition, the impact of lightning on the fire risk was assessed. Approximately once in ten years, widespread drought occurs in Finland accompanied with high temperatures, low air humidity and high wind speed. These conditions lead to high fire risk index values, which are typical in southern Europe and Mediterranean countries. Individual days when the spread of fires into conflagrations is possible over some smaller area exist in southern Finland almost every year, but more rarely in the north. During the upcoming decades, the probability of these kinds of weather conditions to occur will become higher due to the ongoing climate change.

Widespread forest fires can cause severe economic damage. According to earlier estimates, the economic costs related to a fire of a scale of 10 000 ha would be several tens of million euros. Finnish climate does not prevent large-scale fires from occurring; this emphasizes the importance of fire surveillance and prevention activities, and it is essential to keep the risk analyses related to prevention and extinguishing of fires updated.