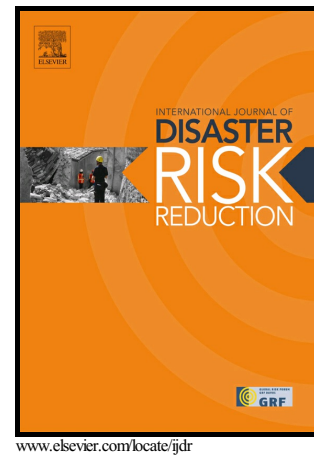


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Factors contributing to a long-term decrease in national lightning fatality rates: case study of the United Kingdom with wider implications

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Factors contributing to a long-term decrease in national lightning fatality rates: case study of the United Kingdom with wider implications.

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Abstract

Decadal average lightning fatality rates in the United Kingdom have decreased markedly from 1.09 deaths per million population per year ($M^{-1}yr^{-1}$) in the 1850s to 0.02 $M^{-1}yr^{-1}$ by the 2010s. Factors contributing to the decrease are explored. They include a large reduction in the national workforce engaged in manually-intensive agriculture. Consequently, agricultural workforce deaths fell from 38% of all lightning deaths around 1850 to 9% by 2000. The percentage of the national population living in urban areas, where many jobs were indoors, increased. As buildings were modernised with electric and plumbing circuits they offered greater protection from lightning. Consequently, deaths indoors fell from 39% in 1850 to 11% in 1950, and with none in the past 50 years. Other factors contributing to lower fatality rates in recent decades included improved thunderstorm forecasts, lightning location detection systems, stricter safety regulations for outdoor workers, advances in the medical treatment of lightning casualties, better communication and road networks to request and receive medical help promptly, and greater public awareness of the lightning threat. Factors slowing down the fatality rate decrease include population growth and, in recent decades, the increased participation in outdoor leisure and sports pursuits in exposed locations. Fatality rates in other countries are explored. It is suggested that by recognising the influence each factor has on lightning fatality rates, countries currently experiencing high lightning fatality rates may be able to accelerate and enhance the beneficial impacts of some factors, albeit after adjustments to reflect their national social, economic and cultural characteristics.

Keywords

Lightning risk; Annual lightning fatality rates, Weather hazard

1. Introduction

The annual number of fatalities attributed to lightning and the fatality rate per million people per year in the United Kingdom (UK) have decreased markedly since the mid-nineteenth century. Reasons for this decrease are explored and the relative influence of each factor is assessed, where possible, and discussed. Factors examined include changes in occupations, population, urbanisation, building utility services, accuracy and communication of warnings of lightning, public awareness of lightning risk, medical treatment of casualties, participation in outdoor leisure and sports activities, and long-term frequency of thunderstorms and lightning flash rates.

The UK lies in the mid-latitudes with a temperate oceanic climate with thunderstorms developing up to 15-20 days per year on average, with maximum activity occurring in

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