

The prediction in extreme wind events on southern Canada with convection-permitting model

Xiao Ma, Global Institute for Water Security; Yanping Li GIWS, Fei Huo GIWS

Extreme wind events are among the most concerning natural disasters, as they can cause damage to buildings and infrastructure through strong surface wind speeds. Considering the potential impact of climate change on extreme wind events, this study utilizes a 4-km convection-permitting Weather Research Forecasting (WRF) climate model to predict extreme wind events in southern Canada (up to 52N). The high-resolution model provides an advantage in representing terrain and results in fewer uncertainties. The study presents a statistical analysis of the spatial distribution of extreme wind speeds simulated over southern Canada and predicts their future state. Meanwhile, The Peaks Over Threshold (POV) method is employed to extrapolate extreme winds with different return periods and their response to climate change. Finally, the relationship between deep convection and extreme wind speeds is investigated through the use of Convective Available Potential Energy (CAPE) and Storm Relative Helicity (SRH).