

Climate change threatens future Winter Olympics

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Climate change will limit where the Winter Olympics can be held as winter changes across the Northern Hemisphere, according to a study by an international team of researchers led by the University of Waterloo.

The study, involving researchers from Canada, Austria and the United States, found that if global emissions of greenhouse gases are not dramatically reduced, only one of the 21 cities that have previously hosted the Winter Olympics would be able to reliably provide fair and safe conditions for the snow sports program of the Games by the end of this century. However, if the Paris Climate Agreement emission targets can be achieved, the number of [climate](#)-reliable host cities jumps to eight, with only six considered unreliable.

"The world of winter sport is changing as [climate change](#) accelerates, and the international athletes and coaches we surveyed are witnessing the impacts at competition and training locations, including the Olympics," said Daniel Scott, a professor of Geography and Environmental Management at Waterloo."

In conducting the study, the researchers reviewed historical climate data from the 1920s to the present day, and future climate change scenarios for the 2050s and 2080s.

They also surveyed international athletes and coaches and found that 89 percent felt changing [weather patterns](#) are affecting competition conditions, and 94 percent fear climate change will impact the future development of their sport.

"We wanted to understand from the athlete's perspective what climate and snow conditions made competition fair and safe, and then determine which Olympic hosts could provide those conditions in the future," added Natalie Knowles, a Ph.D. student and former Canadian elite skier involved in the study.

Weather risk management is more and more important as the average February daytime temperature of host cities has steadily increased—from 0.4°C at the Games held in the 1920s to the 1950s, to 3.1°C at Games during the 1960s to 1990s, and 6.3°C in Games held in the twenty-first century (including the Beijing Games). Additional 21st-century warming of 2°C to 4.4°C is projected depending on our emission pathways.

"We've studied the many ways the Winter Olympics has reduced weather risk since the first Games held in Chamonix, France nearly 100 years ago," said Michelle Ruty of Waterloo's Faculty of Environment. "But there are limits to what weather risk management strategies can cope with, and we saw those limits exceeded in Sochi and Vancouver."

"Climate change is altering the geography of the Winter Olympic Games and will, unfortunately, take away some host cities that are famous for [winter](#) sport," said Robert Steiger of the University of Innsbruck in Austria. "Most host locations in Europe are projected to be marginal or not reliable as early as the 2050s, even in a low emission future."

"The International Olympic Committee will have increasingly difficult decisions about where to award the Games, but the world's best athletes, who have dedicated their lives to sports, deserve to have the Olympics located in places that can reliably deliver safe and fair competitions," added Siyao Ma of the University of Arkansas.

The International Olympic Committee has made climate change a priority as it is a founding organization of the United Nations Sports for Climate Action Framework.

"No sport can escape the impacts of a changing climate. Achieving the Paris Agreement targets is critical to save snow sports as we know it and ensure there are places across the world to host the Winter Olympics,"

said Scott.

Knowles added: "Sport can be an important agent for change for many people. Athletes want to be a bigger part of the solution."

The study, *Climate change and the future of the Olympic Winter Games: athlete and coach perspectives*, was recently published in the journal *Current Issues in Tourism*.

More information: Daniel Scott et al, *Climate change and the future of the Olympic Winter Games: athlete and coach perspectives*, *Current Issues in Tourism* (2022). [DOI: 10.1080/13683500.2021.2023480](https://doi.org/10.1080/13683500.2021.2023480)

Provided by University of Waterloo

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