Atmospheric rivers may hasten Australia's snow melt

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Credit: Greg Brave

The Australian Alps may suffer from a loss of snow and surrounding regions could endure flooding as climate change supercharges phenomena known as "atmospheric rivers."

Professor Hamish McGowan from The University of Queensland said research showed this phenomenon would likely drastically alter Australia's alpine wilderness.

"Atmospheric rivers are long, narrow regions of high moisture content in

the lower atmosphere that transport most of the water vapor from the tropics to the sub-tropics and midlatitudes," Professor McGowan said.

"As the name suggests, they're like large rivers in the sky, often extending over thousands of kilometers, and as the climate warms, the intensity of these events is predicted to become more extreme and frequent.

"Climate change means more rain on the snowpack, and increased snowmelt in these regions.

"Because of the fragile nature of the marginal Australian snowpack, even the smallest increases in energy from rain-on-snow events can trigger rapid snowmelt, sometimes leading to severe flash flooding."

While atmospheric rivers can be vital in bringing rainfall and at times breaking droughts, their increasing unpredictability places communities around the globe and hundreds of billions of dollars' worth of infrastructure at risk.

As the rate of global warming hastens, snow-covered areas in Australia and abroad could take on a completely different complexion by 2050.

"Because snowpacks are being forced upslope, and winter-time precipitation is declining, we'll see quite drastic reductions in the length of the Australian ski season, which will become very reliant on man-made snow," Professor McGowan said.

"Areas such as western United States will be similarly affected, as atmospheric rivers have a huge impact on the seasonal snowpack in those regions.

"This has already been shown to result in significant snowfalls at higher

elevations, and unexpected and sometimes catastrophic flooding events, which cost the region up to $1.1 billion US annually."

Professor McGowan said the future of Australian Alps hangs in the balance, and hinges on a variety of factors.

"The Australian Alps snowpack is marginal already but is also facing reductions in snow depth and winter-time precipitation, as well as predicted reductions in snow cover to the extent of 60 percent by 2070," he said.

"Collectively, these factors may lead to more fleeting snow cover in the Australian Alps by 2050 or even sooner."

The research has been published in *Journal of Hydrometeorology*.

More information: Hamish McGowan et al, Atmospheric Rivers: An Overlooked Threat to the Marginal Snowpack of the Australian Alps, *Journal of Hydrometeorology* (2021). DOI: 10.1175/JHM-D-20-0293.1

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