Media release

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Climate change made the rainfall that led to May 2021 flooding in Canterbury more severe

Researchers studying the effects of climate change on severe weather events in New Zealand have found that the extreme rainfall that brought flooding to Canterbury in May 2021 was 10% to 15% more intense as a result of human influence on the climate system.

The findings come from the MBIE-funded research project *Extreme Weather Event Real-time Attribution Machine (EWERAM)* that seeks to provide scientific analysis and expert assessment to inform statements about the role of climate change in the severity and frequency of extreme weather events. The project calls on the skills and expertise of researchers from five institutions in New Zealand, namely, Bodeker Scientific, MetService, NIWA, Victoria University of Wellington, and the University of Canterbury.

As was widely reported at the time, extreme rainfall in Canterbury over the period 29-31 May produced historic flooding. The event was caused by a slow-moving low near central New Zealand that directed an easterly flow onto the South Island, with a subtropical feed of moisture delivering prolonged heavy rain. Rainfall totals of 200 mm in two days were widespread along the Canterbury foothills, peaking at an overall total of 540 mm, over the course of the entire event, at Mt Somers in the headwaters of the Ashburton River. The event prompted MetService to issue a Red Warning and a State of Emergency was declared in response to the flooding and widespread impacts. The Insurance Council of New Zealand lists the insured losses from the event at $43.8 million.

The research team's analysis of this event, using MetService's ensemble forecast system, indicates that compared to a climate system unaffected by human activities, around 10%-15% (depending on the region considered) more rain fell.

A large collection of global climate model simulations, taken from the weather@home project, was also analysed for how the likelihood of such an event occurring may have changed because of climate change. We found that these events are at least 20% more likely to occur today than in preindustrial times.

While these findings are consistent with climate science expectations, i.e., that the intensity and frequency of severe precipitation events will increase as the atmosphere warms and is able to hold more moisture, the characteristics of any single event can vary as a result of climate-induced changes on where the rain falls, and other confounding factors such as thresholds being reached (or not) that initiate such events. While EWERAM has focused on efficient and rapid generation of diagnostic analyses of extreme events, interpretation of those results by climate experts will always be essential in deriving attribution statements.

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Background information can be found on the project page.