# Q+A

## Interview with Dr Sarah Perkins, Research Fellow, Climate Change Research Centre, UNSW

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Global warming is likened to extreme weather on steroids. For Australia, already a country of extremes, that is bad news. Climate change is making heatwaves more frequent and intense, increasing high and low rainfall extremes and worsening droughts, floods, and bushfires.

Climate scientist Dr Sarah Perkins, spoke to The Climate Institute as part of the *Sport and Climate Impacts: How much heat can sport handle?* report, released in January 2015. Her research focuses on heatwaves and temperature extremes. Sarah has investigated trends in heatwaves both globally and over Australia, as well as exploring the role of human activity behind such changes.

### *How does climate change relate to natural variability and extreme events?*

We have been a land of droughts and flooding rains, heatwaves, and all of those sorts of extreme events. That is true to a certain extent. There is an element of natural variability that largely controls these events. For example, we get a lot more rain during La Niña summers and a lot more drought during El Niño summers, that's an example of how natural variability impacts these events.

However, outside of that natural variability cycle, we are starting to see, particularly heatwaves occur much more often, at much higher intensity, and earlier and later in the season.

Yes, we have always had an extreme climate but human induced climate change is making that a lot more extreme.

### *How certain is the science attributing extreme events to climate change?*

In the case of temperature extremes, I would say as solid as it's going to get.

We know that the human element in climate change is unequivocal. It's 99.99% due to humans… And the same goes with what's going on in terms of extreme events.

We know that there's an element of human climate change behind [extreme events]. It's different depending of the region you're looking at; it's different depending on the extreme event you're looking at. But, particularly over Australia, looking at things like extreme temperature or heatwaves, there is an amount of human signal behind almost all of those events, particularly when it comes to temperature.

I think we can safely say that for all temperature extremes, there would be a human element. Every time you see an extreme heatwave or extreme hot day we can say that that event has increased in its likelihood of occurrence due to human induced climate change…

In some ways it is still an emerging area, because there are different techniques to how to work out the human signal… But they are all consistently saying the same thing; that humans have a role to play in the extreme events that we are seeing now. The five papers in the Bulletin of the American Meteorological Society is a prime example of that.

### *2013 was Australia's hottest year on record, 2014 follows behind as third-warmest on record, sign of more to come?*

2013 was the hottest year on record. But the thing about 2013 is that it was in a state of natural variability where it should have been average. There was no El Niño or La Niña, we were expecting average conditions yet we got extreme temperatures throughout the entire year, and we usually only as associate that with an intense El Niño. And this is what we're really worried about, if we are seeing such intense events in what should be an average year, what's going to happen when we get an intense El Niño?

### *And what are the human impacts?*

People can only cope with certain degree of heat for certain periods of time, and it's been shown that night-time temperature are particularly important for heatwaves, and if they're increasing, which they are, people can't reboot for the next day. There are impacts on infrastructure; there are impacts in ecosystems. Anything that is impacted by weather will be impacted by heatwaves, and sporting events are no exception.

*The full Sport & Climate Impacts report and associated content such as infographics can be found at www.climateinstitute.org.au/sport-and-climate.html*