

# SEVERE WEATHER IN A CHANGING CLIMATE

2ND EDITION September 2020

Climate change is having a significant impact on Australian communities right now – in the last 12 months alone, Australia has experienced devastating bushfires, severe storms and damaging hail. Last year was also Australia’s hottest and driest year on record.

In a warming climate, extreme weather events will become more frequent and intense for many regions of Australia, causing greater property, personal and economic damage, and resulting in further hardship for our communities.

The Severe Weather in a Changing Climate 2nd Edition report by IAG and the National Center for Atmospheric Research (NCAR) examines current and future climate change impacts

on the severe weather experience across Australia, based on the current understanding of the latest scientific data as of July 2020.

It is an updated edition of the November 2019 report and reflects extensive feedback from academic institutions across Australia and new research that has been published since the first report was prepared.

For the full report go to [iag.com.au/severe-weather-changing-climate-2nd-edition](http://iag.com.au/severe-weather-changing-climate-2nd-edition)

## WHAT’S NEW IN THE REPORT?

- This report uses the latest scientific information to confirm and extend many of the predictions and assessments from the original report.
- What this shows us is that the impacts of climate change are already occurring, and extreme weather events are likely to become more frequent and damaging in the future, with different impacts across the country.
- The expert feedback in the report has doubled, now citing about 300 scientific papers and technical reports.
- In an important development, we’ve drawn on the latest data to add a new chapter about the connection between different extreme weather events – and how multiple, connected events in close succession may lead to more devastating consequences for communities.
- The increasing risks of multiple types of natural disasters across Australia highlights the importance of taking actions now to protect communities from the worst impacts of the rapidly changing climate that we are living in.

## SEVERE WEATHER EVENTS



Rising Temperature



Bushfire



Tropical Cyclones



East Coast Lows



Hail



Rain and Floods



Sea Level Rise

### THE RISING TEMPERATURE



- Since the pre-industrial period (1850-1900), the average global mean temperature has already risen by more than 1°C.
- It’s highly likely that this warming will continue and could reach 1.5°C within the current decade and 2°C by as early as 2036.
- This accelerating change in the average global mean temperature will increase the frequency and intensity of many weather and climate extremes substantially.

### RAIN AND FLOODS



- Intense bursts of short-duration rain are expected to increase across almost all of Australia – even in areas likely to become drier overall.
- This will likely result in increased severe flash flooding in urban areas and small river catchments.
- Recent research shows that rainfall in some severe weather systems is increasing at a much faster rate than previous estimates of a 7% increase per degree of global warming. This is likely to contribute to even higher flood risks in some regions.

### EAST COAST LOWS (ECL)



- Evidence suggests that we’ll likely see fewer of the less damaging types of ECLs, which normally occur over winter and spring, but we’ll see an increase in the more damaging lows that typically happen over summer and autumn.
- A recent example of a destructive ECL is the February 2020 storm event across Queensland and New South Wales (which amounted to an estimated \$958 million in insurance losses as of 27th August 2020\*).

\* Data from the Insurance Council of Australia

## TROPICAL CYCLONES (TC)



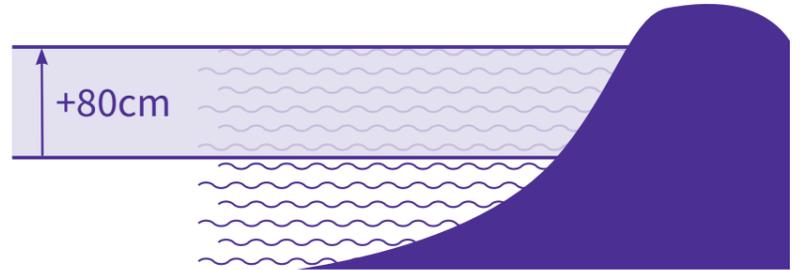
- We'll see a higher proportion of the most intense TCs and they'll be more devastating and destructive for communities. Some recent examples of destructive TCs include Cyclones Yasi, Marcia, Debbie and Damien.
- TCs will also extend further south:
  - TC risks are likely to increase more rapidly in south-east Queensland and north-east New South Wales, affecting more heavily populated areas, compared to farther north.
  - On the west coast, TC impacts may increase in the coastal districts of south-west Western Australia.
- The higher the air temperature, the more water the atmosphere holds and the more energy is in weather systems. TCs in a warmer world will carry more water, which will result in more rain over larger areas. This will lead to an increased risk of flooding and wind-driven rain damage.



## SEA LEVEL RISE



- It's likely that the sea level will rise by around 80cm by 2100 on average, and will continue to increase for centuries beyond 2100 regardless of whether or not we reduce emissions right now.
- However, there are more extreme scenarios that should be considered around planning decisions for coastal communities, to help protect future generations.
- Sea level rise is expected to accelerate around Australia's coastline but at different rates.
- The higher the sea level, the more risk coastal living communities face from a range of impacts, including storm surge and coastal erosion – particularly when coupled with other extreme events such as the increased risk of more damaging east coast lows and tropical cyclones.



## BUSHFIRES



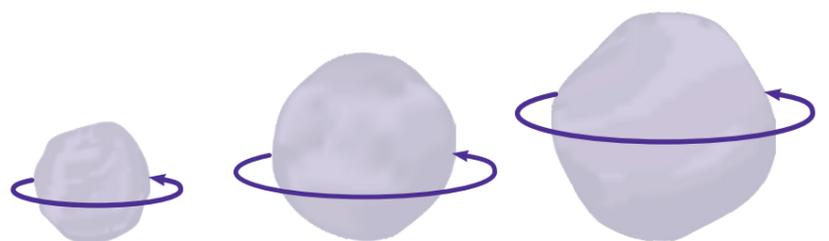
- Bushfire weather risk, including the most catastrophic types of fire weather conditions, is expected to increase across most parts of the nation.
- In a warmer world we should expect longer fire seasons and more extreme bushfires, which will reduce the time between fire seasons for fuel management activities, including hazard reduction burns.
- These catastrophic fire events are life-threatening and have devastating physical, social and financial impacts on communities.
- Even the highest Bushfire Attack Level (BAL) construction specifications are not designed to withstand fires in catastrophic conditions and were not adequate for the 2019-2020 season, so it's important that business, community groups and governments work together to plan for and manage this risk.



## HAIL

There are three categories of hail size used to describe the severity of a hailstorm:

HAIL TYPE	SIZE	CUSTOMER IMPACTS
Giant hail	Hail that is 5cm or greater in diameter – about the size of a lid of a coffee cup	When hail reaches 5cm in diameter property damage can include cracked tiles, dented metal roofs and broken windows
Large hail	Hail that is 2cm-4.9cm in diameter – greater than the diameter of a \$1 coin	When hail exceeds 2cm in diameter motor vehicles and caravans are damaged
Small hail	Hail that is less than 2cm in diameter – typically the size of a pea	Large quantities of small hail can damage crops



- SMALL HAIL**  
2cm < Diameter
  - LARGE HAIL**  
2- 4.9cm Diameter
  - GIANT HAIL**  
5cm > Diameter
- New research shows that increasing hail risk is already occurring. This supports earlier conclusions that the frequency of large and giant hailstorms have increased over the last few decades, particularly across south-east Queensland and north-east and eastern New South Wales.
  - In future, the risks of large and giant hailstorms are expected to shift further south down the east coast of Australia, with fewer damaging hailstorms in northern and central Queensland.
  - In a warmer climate, damaging hail is expected to increase for the capital cities of Sydney, Canberra, Melbourne and, to a lesser extent, Adelaide and Perth. The entire region from the Hunter in New South Wales to eastern Victoria will also likely experience increased hail risk.