

# The Queensland floods

All GCSE geography courses expect students to understand the causes and consequences of floods and flood management. This article provides an excellent case study of a recent flood event

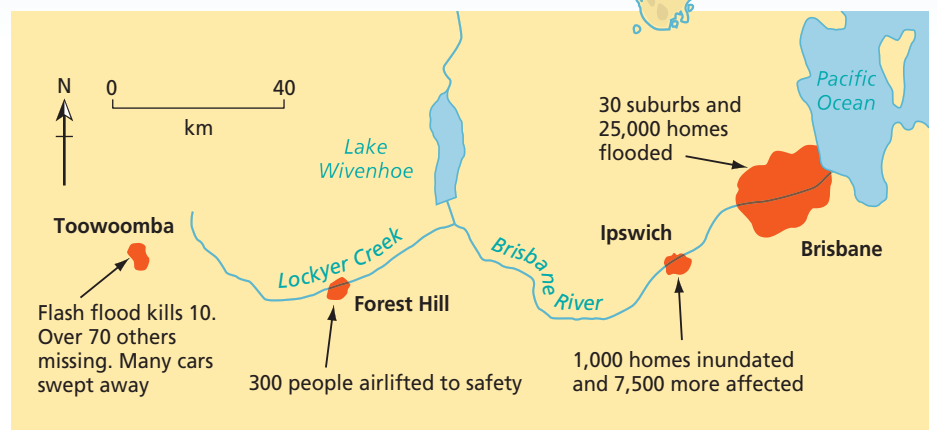
In December 2010 heavy rains battered the Australian state of Queensland, making it Queensland's wettest December on record. The torrential rains continued over Christmas, peaking in January 2011 and leading to widespread flooding which affected at least 70 towns, including Brisbane, Rockhampton, Bundaberg and Toowoomba (Figure 1). Three-quarters of the state of Queensland was declared a disaster zone.

## No stranger to flooding

Queensland is accustomed to heavy rain and flooding but not since 1974 have things been as bad as in early 2011. The initial problems were centred on the town of Rockhampton, then the rains moved south to threaten the state capital, Brisbane. This is Australia's third largest city, with a population of 2 million. The danger was mainly posed by 'slow floods', resulting from the steady rise in river levels over a period of time. This meant there was time for flood warnings to be broadcast,



Figure 1 Location of Brisbane and surrounding area



for sandbags to be distributed, and for residents to move out to refuges as the threat level became more serious.

On 12 January 2011 the Brisbane River which flows through the centre of the city peaked at 4.46 metres above its normal level. Queensland Premier Anna Bligh said: 'We've seen scenes of unbelievable devastation and destruction. What I'm seeing looks like a war zone in some places.'

## Flash floods

Toowoomba, 80 kilometres inland from Brisbane, was hit without warning on 9–10 January by a flash flood, the result of 36 hours of incessant rain amounting to 160 mm. Amateur video footage showed the river rising and sweeping cars away. At least 10 people were killed. Resident Charlie Green commented: 'It would be ironic if it wasn't so tragic. We have just



Aerial view of Rockhampton on 2 January 2011

endured 10 years of drought, unable even to wash our cars with town water.'

### Key impacts

- At one point, an area larger than France and Germany combined was under water.
- 35 people died in incidents related to the flooding.
- 30 suburbs and over 25,000 homes were flooded in Brisbane.
- Over 100,000 properties had their electricity cut off as a precaution against the flooding of electricity substations.
- As the floods receded, putrid mud and debris was left throughout the city.
- Australia is the world's largest exporter of coking coal, used in steel production. Much of it comes from Queensland's mines, many of which were flooded.
- Australia is the world's fourth largest exporter of wheat. The rain damaged the crop so the wheat could not be used for

bread-making and was downgraded to be used as animal feed, causing heavy losses for farmers.

- Estimates suggest that Australia's GDP will be reduced by A\$30 billion (£18.64 billion) as a result of the floods.

### Flood management

As a consequence of floods in 1974 the Wivenhoe dam was built on the Brisbane River, 80km upstream from the city, to help control river flow. However, the continuous rains of early 2011 filled the dam and by 11 January it was at 190% over capacity. To prevent water spilling over the top of the dam, water was released at a rate equal to 6,000 swimming pools per second. This, combined with water from the flooded Lockyer valley, increased the threat to Brisbane but an official said: 'If we don't do it now there will be worse flooding later.' Releases from the

dam accounted for 80% of the peak floodwaters through Brisbane.

The completion of the Wivenhoe dam over 30 years ago resulted in dramatic changes in Brisbane, with rapid urban development and the risky strategy of building on floodplains. Building close to the river means rainwater can no longer flow away safely and it resulted in flooding in areas of the city that had been safe in the floods of 1974.

### La Niña's contribution

La Niña is a natural weather event caused by unusual surface water temperatures in the Pacific Ocean. Temperatures are cooler than normal in the eastern Pacific along the coast of South America, and much warmer than normal in the western Pacific, near Australia. Cold water rises from the ocean's depths off the coast of South America, then surges west across the Pacific, trapping warm water against



Volunteers helping with the clean-up in Brisbane on 16 January

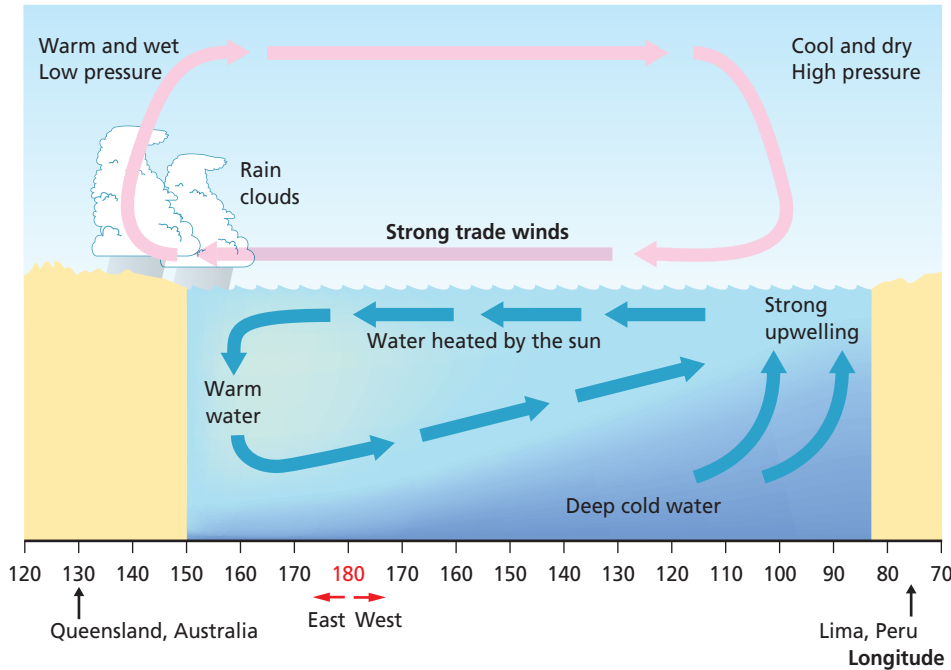


Figure 2 Developments of La Niña

the east coast of Australia. This in turn generates heavy rain clouds (Figure 2). La Niña's effects are far-reaching and varied. The 2010–11 La Niña was one of the strongest in decades, producing easterly winds and unusually heavy rain in Queensland.

Experts differ in their opinions about whether global warming is to blame for the floods. Kevin Trenberth from the US National Center for Atmospheric Research thinks it is. He says that global warming is responsible for a half-degree

rise in ocean temperatures off Australia and that this produced extra evaporation which intensified the recent rainfall.

Others disagree: Rupa Kumar Kolli is a world expert on La Niña and he believes that there is not enough evidence to say whether global warming has any impact on La Niña.

### Aid efforts

Help for Queensland has come mainly from within Australia. The Australian Defence Force was activated to deal with

the flood problems and on 9 January an appeal on national television raised more than A\$10 million. At the Twenty20 cricket match between Australia and England on 12 January both teams donated part of their match fee to help flood victims. On 16 January, the day before the start of the 2011 Australian Tennis Open, players including Roger Federer and Rafael Nadal took part in a Rally for Relief attended by 15,000 people, which raised A\$750,000. In addition, an organisation called the Queensland Reconstruction Authority was formed to coordinate the rebuilding programme.

The Australian government has promised to raise the A\$5.6 billion needed to rebuild the flood-affected regions. Two-thirds of this multi-billion-dollar funding will be delivered through spending cuts, while the remaining third will be provided by a 1-year tax of all Australian taxpayers except people directly affected by the floods and low-income earners.

### Conclusion

Despite the severity of the floods, relatively few lives were lost. This is partly explained by most of the flooding being of the 'slow' variety, allowing the authorities to warn people in time for them to leave. It also helped that Australia has effective disaster planning, so there were arrangements in place to be able to deal with the situation. Additionally, most of the people affected were covered by insurance, which will make the long-term consequences less painful. By late February 2011, the government Disaster Recovery Payments scheme had granted over 373,000 claims and paid out A\$438 million.

The Queensland floods were followed by flooding in the state of Victoria after a week of rainfall that broke records in many areas. Two deaths were recorded, as well as an estimated A\$2 billion worth of damage. These floods were also attributed to La Niña. Worryingly, Australian climatologists are saying that they expect the effects of this La Niña to continue for months, possibly even years.