

Rising seas to hit tropics hardest

February 19 2013, by Alex Peel



Sea levels around the equator will rise up to 150 per cent more than the global average by 2100, new research reveals.

The study, published in [Geophysical Research Letters](#), highlights the vulnerability of low-lying populations throughout the tropics, including western Australia, Hawaii and the islands of the South Pacific.

'We are successful in defining the patterns, known as sea level fingerprints, which affect sea levels,' says Professor Giorgio Spada of Italy's University of Urbino, who led the study.

'This is paramount for assessing the risk due to inundation in low-lying, densely populated areas.'

It has long been known that sea levels change by different amounts in

different places.

But this research is the first to detail what those changes will look like as the oceans react to our [changing climate](#).

The team, including two researchers from the Bristol University's [glaciology](#) centre, used computer models to investigate three key influences over the global pattern of sea-level rise.

At the end of the [last ice age](#) 10,000 years ago, billions of tonnes of [ice](#) melted from Earth's polar regions, lifting an enormous weight from the rocks beneath. The Earth's surface has been slowly rebounding ever since, causing some regions to emerge from the sea while others subside.

The sheer mass of the remaining ice sheets gives them a strong [gravitational pull](#), sucking in the seas around them like a giant plunger. As those ice sheets melt, the plunger will be released and the water redistributed around the globe.

As the oceans warm, they will also expand. Complex weather and climate patterns will mean that some areas will warm and expand more than others.

'The most vulnerable areas are those where the effects combine to give sea-level rise that is significantly higher than the global average,' says Spada.

'The total rise in some areas of the equatorial oceans worst affected by the terrestrial ice melting could be 60 centimetres if a mid-range sea-level rise is projected, and the warming of the oceans is also taken into account.'

For Europe, it means that sea levels will continue to rise, but by slightly less than the global average.

According to the 2007 Intergovernmental Panel on Climate Change (IPCC) report, the effect of melting ice was the largest remaining source of uncertainty in predicting sea-level rise.

This work was part of the ice2sea project, led by the British Antarctic Survey's Professor David Vaughan, which is attempting to address that uncertainty.

'In the last couple of years, programmes like ice2sea have made great strides in predicting global average sea-level rise,' says Vaughan.

'The urgent job now is to understand how global [sea-level](#) rise will be shared out around the world's coastlines.'

'Only by doing this can we really help people understand the risks and prepare for the future.'

The research will contribute to the new IPCC assessment of the state of the Earth's climate, which will begin to emerge later this year.

More information: Spada G, Bamber JL, Hurkmans RTWL, The gravitationally consistent sea-level fingerprint of future terrestrial ice loss, 2013, *Geophysical Research Letters*, [doi:10.1029/2012GL053000](https://doi.org/10.1029/2012GL053000)

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