

# The tides they are a changin'

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Scientists from the University of Southampton have found that ocean tides have changed significantly over the last century at many coastal locations around the world.

Increases in high tide levels and the tidal range were found to have been similar to increases in average sea level at several locations.

The findings of the study are published online in the journal *Earth's Future*.

It is well documented that global average sea levels are rising; but tide levels, have generally been considered to have undergone little change on decadal time scales. It is also often presumed that [tides](#) will not change much over the next century. As such, long-term changes in tides are not accounted for in many practical applications and scenarios affected by [rising sea levels](#).

The team used a dataset of 220 sea level records from around the world, which ranged in length from 30 to 150 years. By extracting the tide data from the other components of sea level, they were able to isolate changes in 15 tidal levels by looking at different records of high and low waters from the tidal signal.

Lead author Robert Mawdsley, postgraduate research student in Ocean and Earth Science, says: "We find that at many sites around the world significant changes in tidal levels have already occurred, and at some sites the magnitude of the changes are comparable with the increase in

global mean sea level through the 20th century. For example, increases in average high water of over one millimetre per year have occurred around the world, including Calais in France, Manilla in the Philippines, Wilmington in the USA and Broome in Australia.

"The magnitude and global distribution of changes in tides have been hinted at before," said co-author Dr Ivan Haigh, Lecturer in Coastal Oceanography. "However, here we have been able to assess changes in different tidal levels, which are used for many practical applications. Tides exert a major influence on the coast, affecting coastal flooding and erosion, navigation, tidal energy extraction, sediment movement and the extent of species in coastal ecosystems. Therefore, the changes we have identified have wider ranging practical and scientific implications, particularly if they increase in the future."

"The cause of these changes is complex and appears to be a combination of mechanisms from local to global, with the primary driver being the rise in [sea level](#) associated with climate change," says co-author Dr Neil Wells, Associate Professor in Physical Oceanography and Meteorology. "Further research is required to more fully understand the mechanisms causing these changes and to understand how tides might further change in the future."

**More information:** Robert J. Mawdsley et al., "Global Secular Changes in different Tidal High Water, Low Water and Range levels," *Earth's Future*, [DOI: 10.1111/eft2.2014ef000282](https://doi.org/10.1111/eft2.2014ef000282)

Provided by University of Southampton

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