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## Most big coastal cities have areas sinking faster than sea level rise

James Dinneen - Yesterday 5:25 AM



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126

By James Dinneen



Ho Chi Minh City in Vietnam is sinking 16.2 millimetres a year Shutterstock/Nguyen Quang Ngoc Tonkin  
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Nearly all of the 48 most populous coastal cities have areas sinking more rapidly than seas are rising.

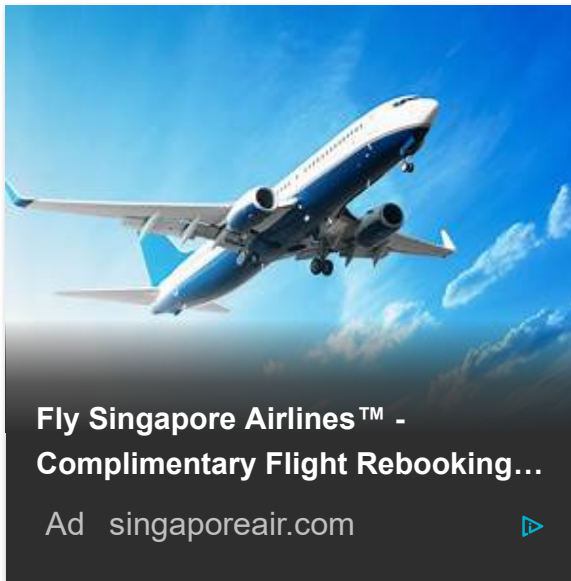
Globally, sea levels are rising about 3.7 millimetres a year on average, much of which is from melting ice [driven by climate change](#). In many places, land is also sinking due to [groundwater pumping](#), oil and gas extraction and sediment compacted by heavy buildings – a process called land subsidence.

[Cheryl Tay](#) at Nanyang Technological University in Singapore and colleagues used radar from satellites to measure rates of subsidence within the world's 48 most populous coastal cities between 2014 and 2020.

In 44 cities, the most rapidly subsiding areas were sinking faster than sea levels are rising. Cities in south and southeast Asia were some of the most rapidly subsiding cities, including Tianjin in China and Ahmedabad in India, which both had areas sinking faster than 20 millimetres a year.

### Exploring the deep sea [Helen Scales at New Scientist Live this October](#)

The median rate of sinking ranged from 16.2 millimetres a year in Ho Chi Minh City, Vietnam to a rise of 1.1 millimetres per year in Nanjing, China. These rates weren't adjusted for other factors that can raise or lower land level, such as a phenomenon in which land pressed down by ice rises over thousands of years after the ice melts. The researchers measured all areas within the boundaries of a city, even if it was kilometres from the coast.



In a case study of Ho Chi Minh City, researchers found an additional 20 square kilometres would be below sea level and could be inundated if current rates of subsidence continued to 2030. About 880 square kilometres would be below sea level without subsidence. [Rio de Janeiro](#) could see an additional 2 square kilometres inundated, representing a 16 per cent increase to inundation without subsidence.

[Manoochehr Shirzaei](#) at Virginia Tech says the elevation maps used in the case studies to estimate the extent of flooding aren't reliable for

many parts of the world, and that focusing on the most rapidly sinking inland areas of cities rather than areas directly on the coast could “exaggerate the impact” of land subsidence. A [recent IPCC report](#) looking at land level change along the coast globally over a century found a narrower range – the most rapid subsidence was 5.2 millimetres a year.

But if the rapid subsidence reported here were sustained, it could be “a very substantial driver” of sea level related hazards, says [Robert Kopp](#) at Rutgers University in New Jersey, who worked on the IPCC report.

“Land subsidence has always been treated as a side thing,” says Shirzaei. “This puts it in the spotlight.”