

Asian coast cities are sinking, study finds

Rate is faster than for similar places elsewhere; rapid urbanization cited

BY KARINA TSUI

Cities along the coasts of South and Southeast Asia are sinking — even faster than similar cities elsewhere — because of rapid, poorly controlled urbanization, scientists say, heightening risks already posed by rising sea levels.

Over the past two decades, the population of Chittagong in Bangladesh, on the Bay of Bengal, has swelled by more than 120 percent to 5.2 million.

It is also one of the world's fastest-sinking cities, according to new research.

The study, published this week in the journal *Nature Sustainability*, found that land is sinking particularly quickly in coastal cities built on “flat, low-elevation river deltas,” where groundwater and oil extraction are driven by rapid growth and urbanization.

Led by Singapore's Nanyang Technological University (NTU), a group of international scientists used satellite imagery taken between 2014 and 2020 to analyze sinking land across 48 of the most densely populated coastal cities, with populations of at least 5 million, across the world. They found that the median velocity of land subsidence — the rate at which land is sinking — in each of the 48 coastal cities ranges as much as 16.2 millimeters, or more than 0.6 inches annually.

“When large amounts of water are withdrawn from underneath the ground, the sediments compact and start to sink onto itself because there is less water holding up the sediments, thereby causing land to sink,” said Cheryl Tay, an earth sciences PhD student at NTU and lead author of the study.

Cities in Indonesia, Myanmar and India also have some of the highest rates of land subsidence, the study showed.

Washington was among the 48 coastal cities studied but has a relatively low rate of land subsidence — averaging zero millimeters annually — and is at a lower risk of being affected by rising sea levels.

The findings in the report also take into account and provide velocities for neighborhoods farther inland, where rising sea levels can still affect populations through extreme weather events, such as typhoons, hurricanes and floods.

“This study is important because it quantified land subsidence in a globally consistent matter, which can be used to improve estimations of sea level rise,” said Emma Hill, an earth sciences professor at NTU and one of the authors of the report.

The researchers did not investigate the reasons for the land subsidence as part of the scope of the study.

Jakarta, one of the fastest-sinking cities, is set to be replaced as Indonesia's capital city after years of rapid growth, congestion and pollution.

In January, the Indonesian government passed a law outlining how it plans to move the capital to a jungle tract in East Kalimantan, Borneo — a decision that environmental activists say would spur further deforestation.

“By 2030, a large part of Jakarta will be uninhabitable,” said Kian Goh, an architect and urban planner who investigates how cities in the United States and Southeast Asia respond to climate change. “The root cause of land subsidence in cities is development coupled with a lack of adequate planning.”

Goh said that while the study is helpful in giving readers a “big-picture look” at which coastal cities are most vulnerable to land subsidence, it does not unpack the systemic issues heightening risks in those areas. “The places with the highest land subsidence are often home to poor populations living in settlements dating back to colonial times,” she said. “These are riskier areas, where people suffer the most.”

Drilling wells and extracting groundwater would not be necessary if cities had adequate piping and municipal water supplies, Goh said.

“The problems are ultimately due to questions of planning and politics.”