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Scientists extend Singapore's sea level record by 10,000 years

By [Brooks Hays](#)



June 3 (UPI) -- With the help of giant sediment cores, scientists have extended the record of Singapore sea levels by 10,000 years.

The research, published Friday [in the journal The Holocene](#), will help modelers more accurately predict how sea level rise will impact Singapore's coastline in future.

More than a third of the low-lying Asian city-state is less than 16 feet above sea level. If climate change continues apace and Earth's ice sheets continue to disintegrate, rising seas could expose the densely populated island nation to severe coastal flooding.

The latest findings will ultimately help policy makers can use when developing mitigation and fortification plans, researchers said.

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To extend Singapore's sea-level record, researchers extracted 131-foot sediment cores from a drill site at Singapore's Marina South.

By analyzing the presence or absence of marine microfossils, researchers were able to map changes in sea levels dating back to the beginning of the Holocene, 10,000 years ago.

Between 10,000 and 7,000 years ago, a period of global warming rapidly melted Earth's ice sheets, raising sea levels some 65 feet.

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The analysis of ancient sediment layers allowed scientists to better understand how this period of warming and subsequent sea level rise affected Singapore's coastline.

"By dating the Singapore sea-level record to 10,000 years ago, we retrieved crucial new information from the early Holocene period," lead study author Stephen Chua said in a press release.

"This is a period that is characterized by rapid sea-level rise yet remains poorly understood -- until now," said Chua, who completed the study as part of his doctoral work for the Earth Observatory of Singapore at NTU Singapore.

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"This more refined sea-level record also has wider implications," Chua said. "For instance, it would lead to more robust and accurate local projection of sea-level rise, offering a strategic guide for Singapore as it moves to adapt to climate change."

Researchers couldn't just pull sediment cores from anywhere, they had to be sure to pick a drilling location that featured a long history of marine mud and mangrove peat deposits. To do so, scientists analyzed borehole records compiled during infrastructure projects.

"Finding the right place to drill was a huge effort," said co-author Adam Switzer, who leads the Coastal Lab at NTU Singapore's Asian School of the Environment.

"Stephen spent well over a year going over old borehole information from a variety of construction efforts over the last 30 years just to find records that might be suitable. As a result, our understanding of the geology of the whole area has also dramatically improved," Switzer said.

The sediment cores allowed researchers to better understand what Singapore's coastline looked like 10,000 years ago.

For example, the presence of mangrove pollen in ancient sediment layers proved that prior to sea level rise during the beginning of the Holocene, Singapore's southern coast was buffered by thick bands of mangroves.

The discovery suggests the mangrove forests currently surrounding parts of Singapore likely won't survive if sea levels rise continues to accelerate, the researchers said.

"Sea-level rise is a potentially disastrous outcome of climate change, as rising temperatures melt ice sheets and warm ocean waters," said co-author Benjamin Horton, director of the Earth Observatory of Singapore and professor at NTU Singapore.

"Scenarios of future rise are dependent upon understanding the response of sea level to climate changes. Accurate estimates of past sea-level variability in Singapore provide a context for such projections," Horton said.