

Sea-level rise threatens UNESCO World Heritage sites

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Some of the world's most recognisable and important landmarks could be lost to rising sea-levels if current global warming trends are maintained over the next two millennia.

This is according to a new study, published today, 5 March, in IOP Publishing's journal *Environmental Research Letters*, that has calculated the temperature increases at which the 720 sites currently on the list of UNESCO World Heritage sites would be impacted by subsequent sealevel rises.

The Statue of Liberty, Independence Hall, Tower of London and Sydney Opera House are among the 136 sites that would be impacted if the current <u>global warming</u> trend continues and temperatures rise to 3°C above pre-industrial levels in the next 2000 years—a likely and not particularly extreme scenario, according to the researchers.

Also impacted would be the city centres of Brugge, Naples, Riga and St. Petersburg; Venice and its Lagoon; Robben Island; and Westminster Abbey.

Lead author of the study Professor Ben Marzeion, from the University of Innsbruck, said: "Sea-levels are responding to global warming slowly but steadily because the key processes involved—ocean heat uptake and melting continental ice—go on for a long while after the warming of the atmosphere has stopped.



Co-author of the study Professor Anders Levermann, from the Potsdam Institute for Climate Impact Research, said: "After 2000 years, the oceans would have reached a new equilibrium state and we can compute the ice loss from Greenland and Antarctica from physical models. At the same time, we consider 2000 years a short enough time to be of relevance for the cultural heritage we cherish."

As a proxy of where <u>cultural heritage</u> may be currently developing or set to develop in the future, the researchers also calculated the percentage of currently populated places that would be living below sea-level if temperatures increased above pre-industrial levels by 3°C in the next 2000 years.

They found that seven per cent of the current global population would be living on land that would be below sea level and that the distribution of the affected population was uneven—more than 60 per cent of the affected population would be in China, India, Bangladesh, Vietnam and Indonesia.

Additionally, the researchers also calculated the percentage of global land that would be below sea-level under the same scenario. They found that seven countries—including the Maldives, Bahamas and Cayman Islands—would lose 50 per cent of their land and a further 35 countries would lose ten per cent of their land.

Professor Marzeion concludes: "Our results show that if there is a 3°C temperature increase over the next 2000 years, which seems likely to be reached and is generally considered not to be an extreme scenario, the impacts on global heritage would be severe.

"We've assumed that a <u>heritage</u> site is impacted when at least part of it is below local mean sea-level; however, tides and storm surges may dictate whether or not the site should be protected before sea-levels reach this



point."

More information: 'Loss of cultural heritage and currently inhabited places to sea-level rise' Ben Marzeion and Anders Levermann *Environ*. *Res. Lett.* 9 034001 <u>iopscience.iop.org/1748-9326/9/3/034001/article</u>

Provided by Institute of Physics

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