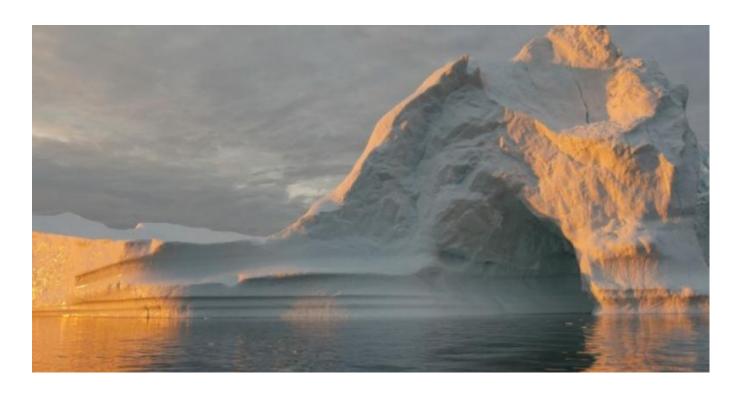Nasa Sees Unavoidable Sea Level Rise Ahead

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Ice sheets in Greenland and Antarctica are melting faster than ever, and oceans are warming and expanding much more rapidly than they have in years past.

Rising seas will have "profound impacts" around the world, said Michael Freilich, director of Nasa's Earth Science Division.

"More than 150 million people, most of them in Asia, live within one meter of present sea level," he said.

Low-lying US states such as Florida are at risk of disappearing, as are some of the world's major cities such as Singapore and Tokyo.

"It may entirely eliminate some Pacific island nations," he said.

There is no doubt that global coastlines will look very different in years to come, US space agency experts told reporters on a conference call to discuss the latest data on sea level rise.

"Right now we have committed to probably more than three feet (one meter) of sea level rise, just based on the warming we have had so far," said Steve Nerem of the University of Colorado, Boulder and leader of Nasa's sea level rise team.

"It will very likely get worse in the future," he told reporters.

"The biggest uncertainty is predicting how quickly the polar ice sheets will melt."

Melting faster
The last major predictions were made in 2013 by the United Nations Intergovernmental Panel on Climate Change (IPCC).

Based on a consensus of international researchers, the IPCC said global sea levels would likely rise from one to three feet by the end of the century.

Nerem said the latest satellite data suggests the higher end of that range is more likely.

Nasa's predictions are based on a series of altimeters that measure ocean height from space. Nasa and French space agency CNES began launching satellites to measure sea level in 1992.

"The instruments are so sensitive that if they were mounted on a commercial jetliner flying at 40,000 feet (1,200 metres) they could detect the bump caused by a dime lying flat on the ground," Freilich said.

The world's oceans have risen an average of almost three inches (7.6 cm) since 1992, with some locations rising more than nine inches (23 cm) due to natural variation, according to these instruments, known as Topex/ Poseidon, and its successors, Jason-1 and Jason-2, Nasa said.

Much of the extra water is coming from melting ice and glaciers. Scientists are particularly concerned about the Greenland ice sheet, which shed an average of 303 gigatons of ice a year over the past decade.

Also, the Antarctic ice sheet has lost an average of 118 gigatons a year.

"One of the things we have learned is that the ice sheets are melting faster than we had previously suspected," said Josh Willis, oceanographer at Nasa's Jet Propulsion Laboratory in Pasadena, California.

"Sometime in the next 20 years we will probably see faster than average sea level rise, so we have to be prepared."

'More worried'
Scientists have never seen an ice sheet collapse, so the question of when sea levels will rise drastically is a major mystery.

According to Tom Wagner, the cryosphere program scientist at Nasa, the paleoclimate record shows that sea levels can rise as much as 10 feet (three meters) in a century or two, if the ice sheets fall apart rapidly.

"We're seeing evidence that the ice sheets are waking up, but we need to understand them better before we can say we're in a new era of rapid ice loss."

Eric Rignot, glaciologist at the University of California, Irvine, said that as the planet warms, there is no reason to expect that ice sheets will melt at the same pace as they did in the past. According to the laws of physics, they will deteriorate faster. And they already are.

"We are not talking about futuristic scenarios," said Rignot.

"On a personal level, the data collected over the past few years make me more concerned about the decay of the ice sheets than I was in the past," he added.

"As we go on, I think we are a bit more worried about what is happening."