

US EPA ARCHIVE DOCUMENT

Expedition to the Maldives to Learn About Sea Level

Part 1. Introduction.

Narrator: Welcome to the Maldives! It's not so easy to find the Maldives on a map because it's one of the smallest countries in the world. In fact, the entire country is a series of small islands in the Indian Ocean.

This is also the lowest country on Earth. On average, the ground here is only five feet above sea level. And the highest point is only about seven and a half feet above sea level!

Part 2. The Climate Connection: Warmer Water.

Narrator: Climate change is causing sea level to rise around the world. Because of the low elevation of the Maldives, this island nation is especially at risk.

Warmer temperatures are causing sea level to rise for two reasons. The first reason has to do with warmer water temperatures. As water gets warmer, it takes up more space. Think of a thermometer: as the temperature rises, the liquid inside expands and rises in the tube. Water behaves in a similar way. Each drop of water only expands by a little bit, but when you multiply this expansion over the entire depth of the ocean, it all adds up and causes sea level to rise.

Part 3. The Climate Connection: Melting Ice.

Narrator: The second reason sea level is rising is because warmer air temperatures are causing more ice to melt around the world. As ice melts on land, the extra water flows into the ocean, which causes sea level to rise. There are many different forms of ice. Glaciers and the giant ice sheets on Antarctica and Greenland are basically large, slow-moving rivers of ice that accumulate on land over a long period of time. Icebergs are chunks of glaciers or ice sheets that break off, fall into the ocean, and float away. And sea ice forms when the top layer of the ocean freezes. All these types of ice are melting more quickly because of warmer temperatures.

Part 4. Test Your Knowledge.

Narrator: Are you ready to test your knowledge? Melting ice only raises sea level if it adds water to the ocean. If the ice took up space in the ocean all along, then it won't raise sea level when it melts. Based on this information, can you figure out which type of ice *does not* raise sea level as it melts?

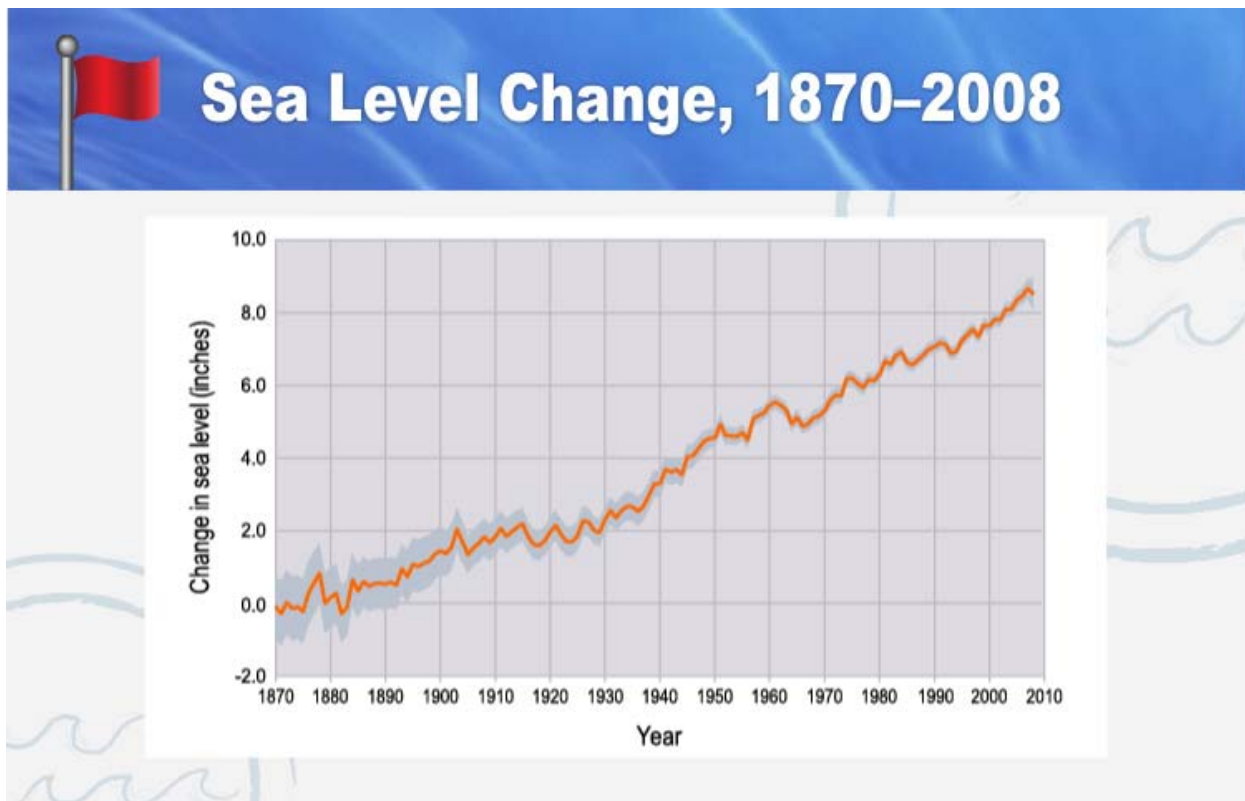
The text on the screen asks: "Which type of ice does not raise sea level as it melts?" You have four choices:

- A. Glaciers
- B. Sea ice
- C. Icebergs
- D. Ice sheets

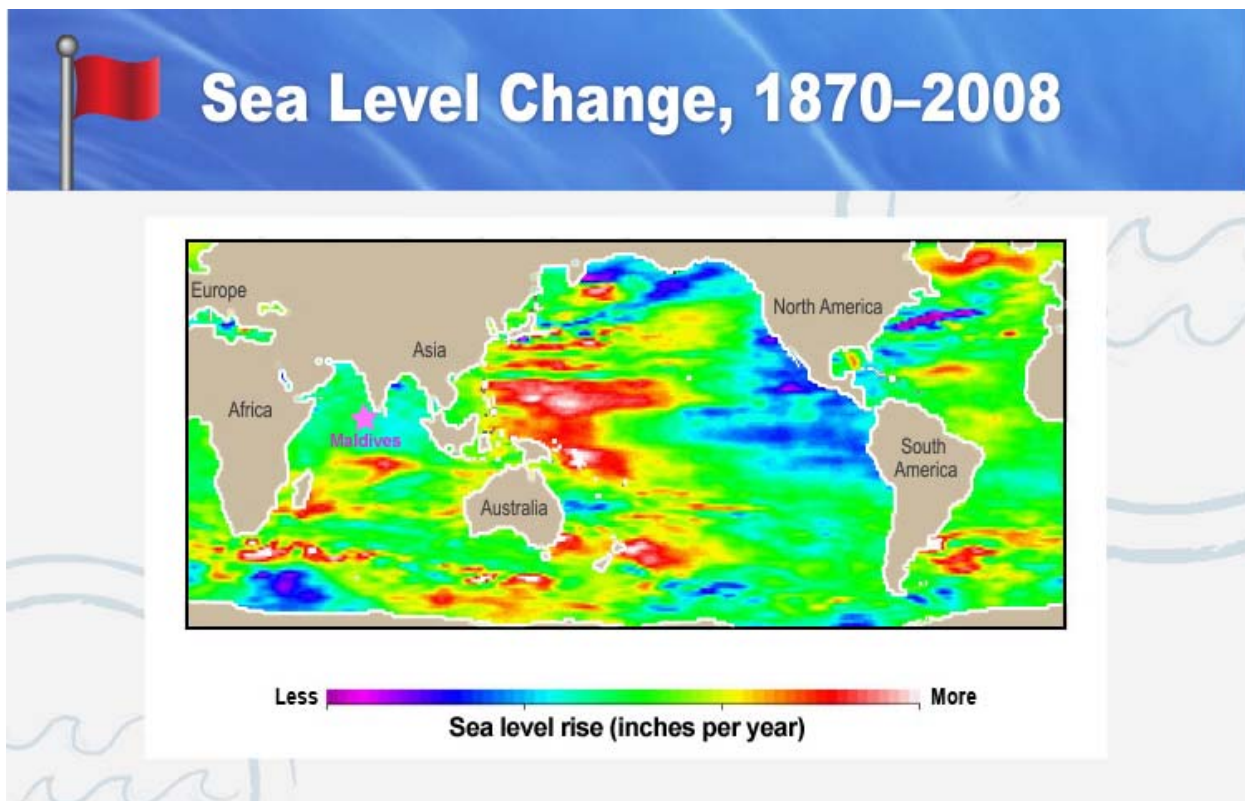
Answer: The correct answer is B. Sea ice forms when the surface of the ocean freezes. When sea ice melts, it doesn't raise sea level because this water was already part of the ocean to begin with. To see

this for yourself, watch a glass of water that already has an ice cube in it. You'll notice that the water level doesn't rise as the ice cube melts.

Part 5. Sea Level Change, 1870–2008.



Narrator: This chart shows the average change in sea level across all the world's oceans between 1870 and 2008. You can see that sea level has been rising for more than a hundred years, and it has been rising faster in recent years. On average, sea level is now rising by about one inch every seven or eight years.



Narrator: Sea level is rising faster in some places than others. This can happen because of wind patterns, ocean currents, and other factors. In addition, sea level may seem like it's changing more in certain places than others because the land itself may be sinking or rising.

Part 6. A Threat to Coastal Areas.

Narrator: Rising sea level is a threat to people who live near the ocean. As sea level continues to rise, some low-lying areas will experience more frequent flooding, especially during high tides or large storms. Very low-lying land could be submerged completely. All this flooding could destroy homes, businesses, and coastal infrastructure such as roads and ports.

Seawater can contaminate fresh water supplies and make them unsuitable for people to use. People can't drink salt water, and it can't be used to water crops because it will damage them.

Rising sea level can also harm important coastal ecosystems like mangrove forests and coral reefs. These ecosystems provide benefits, such as protecting the shores from storms. If sea level continues to rise rapidly, these benefits could be lost.

Part 7. Sea Level Rise Around the World.

Narrator: The Maldives aren't alone in facing the dangers of rising sea level. Rising sea level threatens islands around the globe, such as Bermuda in the Atlantic Ocean, Kiribati in the Pacific Ocean, and the Florida Keys. Climate change also threatens low-lying coastal cities and regions such as New York City; New Orleans; Venice, Italy; and mainland Florida.

Rising sea level could be especially damaging to Bangladesh, a country where millions of people live very close to sea level. Rising sea level won't completely submerge most of these locations but it could leave millions of people without homes.

Part 8. Test Your Knowledge!

Narrator: In many low-lying countries such as Bangladesh, people get water for drinking and irrigating crops from rivers near the coast. As sea level rises, salt water from the ocean will travel farther upstream into rivers and mix with fresh water. So how do you think rising sea level could affect people who get their water from rivers near the coast?

The text on the screen says: "As sea level rises in low-lying areas, salt water from the ocean will travel farther upstream into rivers. How do you think this could affect people who get their water from rivers near the coast?" You have two choices:

- A. These people will have more water to use because rising sea level will raise the water level in the part of the river closest to the coast.
- B. These people will have less water to use because rising sea level will make the water too salty in the part of the river closest to the coast.

Answer: The correct answer is B. People will have less water to use because rivers will become saltier as rising sea level causes seawater to flow farther upstream. People can't drink salt water, and it damages crops.

Part 9. Preparing for Rising Seas.

Narrator: Seawater could flood much of the Maldives and other low-lying regions by the end of this century. Leaders in the Maldives and other places at risk are deciding what they should do to protect their countries.

One way countries can prepare is by relocating people to safer places at higher elevations. In some countries, people have even built artificial islands that are higher above sea level. People can also preserve natural coastal buffers like sand dunes and barrier islands, which protect against a rising ocean. And finally, people can build protective barriers like seawalls and dikes to stop the ocean from flooding the land.

Part 10. What Have You Learned?

Narrator: Your journey to the Maldives is over. What have you learned?

Onscreen text: Climate change is causing sea level to rise.

Narrator: Climate change is causing sea level to rise around the world. As temperatures increase, the water in the ocean gets warmer and expands. Warmer temperatures also melt glaciers and ice sheets, and this adds water to the ocean.

Onscreen text: Low-lying places are particularly at risk.

Narrator: As sea level rises, low-lying areas like the Maldives are particularly at risk.

Onscreen text: Rising sea level can cause flooding and allow salt water to contaminate fresh water.

Narrator: Rising sea level can cause flooding and allow salt water to contaminate fresh water sources, which can reduce the amount of water available for people to use.

Onscreen text: People can take steps to adapt to sea level rise.

Narrator: Countries can take steps to prevent the worst effects of sea level rise, such as relocating people to higher elevations and protecting natural coastal barriers.

Part 11. Congratulations!

Narrator: Congratulations! You've earned a passport stamp by learning how climate change affects sea level.

Onscreen code: 412973