Lesson Plans: When Land Ice Melts

Objective

The objective of this activity is to demonstrate what happens when land ice melts and how it is different from the effect of melting icebergs.

Materials

- A big rectangular container
- Piece of wood (approximately 5 centimeters x 15 centimeter)
- Ice cubes
- Water

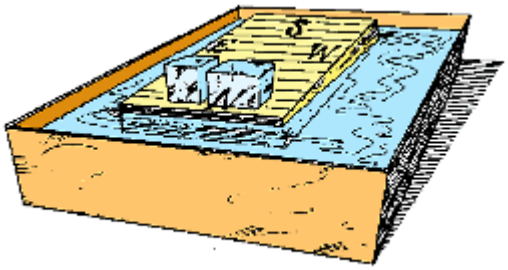
Important Points to Understand

- The Arctic and Antarctica are covered with large, heavy sheets of ice. Other islands like New Zealand have ice masses in the form of glaciers on them.
- When land-based ice melts, more water flows into the sea and sea level rises.
- However, the land on which the ice previously rested rises, too when the load is removed.
- Icebergs in the ocean are broken off bits of land ice.

Preparation

Try to explain what happens to the continents (land) that are floating on the earth's molten core when they are relieved of their heavy burden of ice load.

An increase in elevation of the land is an isostatic response to the removal of the ice load that had depressed the land.



Procedure

1. On the surface of the wood, mark the points of the compass north, south, east, and west.
2. From north to south across the surface draws (east to west) lines at 1-centimeter intervals.
3. Along the north and south edge, mark lines at 2-millimeter intervals.

4. Fill the container with water and place the wood in the water.
5. Put one or two ice cubes on the N edge of the floating wood.
6. Watch and note the level of water in the container and on the N and S edges.

Questions

1. What happens to the water level in the container?
2. What happens to the north and south edges of the block of wood as the ice melts?
3. Do you think melting glaciers and other land-based ice masses will make sea level rise?
4. Will it submerge the continents on which the ice used to be?
5. Most of the world's tide gauges are on the edge of continents that in the recent geologic past had massive ice sheets on them. Can we get a good measure of trends in the world's sea levels from such gauges if we do not properly consider the vertical land movements?

"Courtesy: U.S. Department of Energy's Atmospheric Radiation Measurement Program."