The Effect of Type of Ice Melt (Glaciers versus Floating Ice) on Sea Level Rise

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Introduction

- We were interested in the topic because as South Floridians, we live in a low lying area. This experiment shows how land and sea ice in the world can impact our state.

State the Problem

- What will the impact be from melting ice in the sea and on land?

Hypothesis

- The sea ice will raise the water level.

- Dependent variable – water level height
- Independent variable – land ice/sea ice

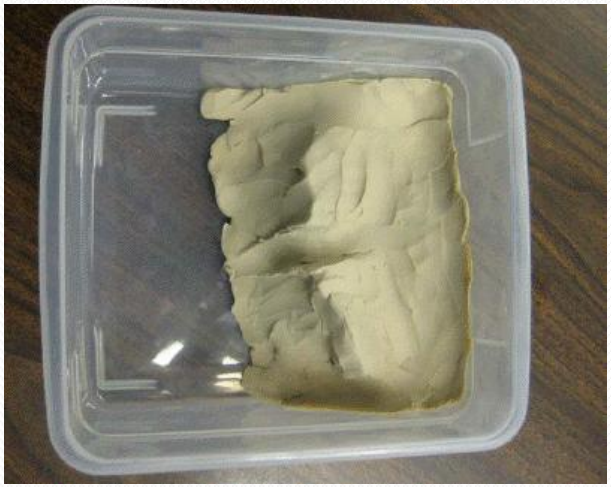
Materials

- 1000 ml water
- Clay mold of a continent
- Container
- Heat lamp
- Ruler
- Ice cubes

Constants:

- 1000ml water
- 4 ice cubes
- Heat lamp
- Measure every 5 minutes for 30 minutes

Methods – Iceberg / Floating Ice



- First, mold clay into the form of a continent and place it in a container up against the corner.
- Next, pour 1000ml of water into the container, the continent should be half in the water.
- Then, measure the initial water level, which should be 2.5cm. Place 4 ice cubes into the water.
- Measure the water level every 5 minutes for 30 minutes to see if and how much the water level rose.

Methods – Glaciers / Land Ice

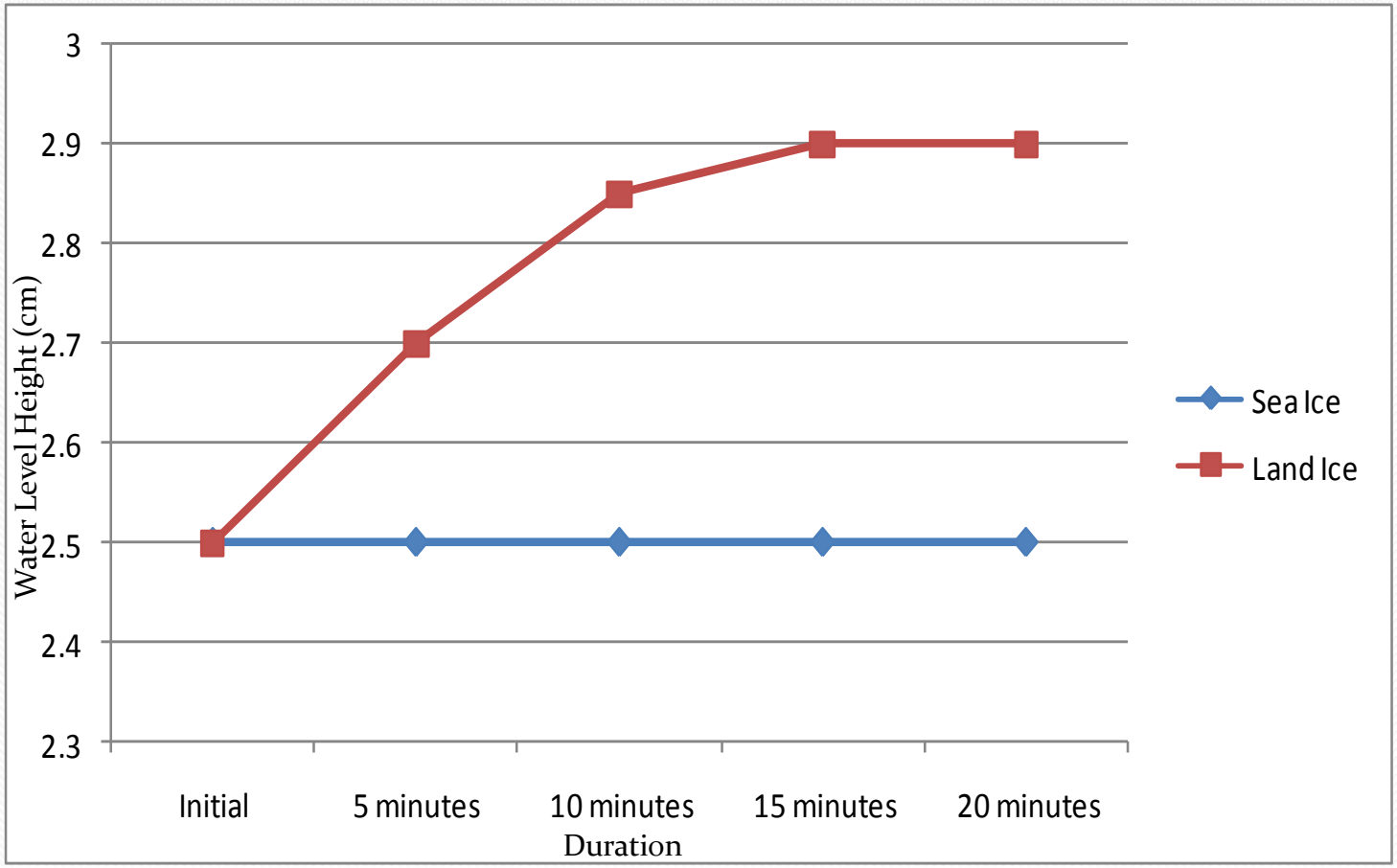
- Pour 1000ml of water into the container.
- Measure the initial water level, 2.5cm.
- Place 4 ice cubes onto of the continent.
- Measure the water level every 5 minutes for 30 minutes.

Findings…

- Icebergs are already floating in the ocean, so melting will not raise sea level. Melting of land-based ice (such as glaciers) will raise sea level.

Results

Type of Ice Melt	Water Level Height	Water Level Height	Water Level Height	Water Level Height	Water Level Height
	Initial	5 minutes	10 minutes	15 minutes	20 minutes
Sea Ice	2.5 cm	2.5 cm	2.5 cm	2.5 cm	2.5 cm
Land Ice	2.5 cm	2.7 cm	2.85 cm	2.9 cm	2.9 cm


3
2.9
2.8
2.7
2.6
2.5
2.4
2.3
Water Level Height (cm)
Initial
5 minutes
10 minutes
15 minutes
20 minutes
Duration
Sea Ice
Land Ice

Conclusion

- In conclusion, our hypothesis was proven incorrect by our experiment. Once melted, the sea ice did not add to the overall amount of water in the “ocean”. This is because as the ice cube was placed in the water, it displaced the water’s volume and filled it with its own volume. When it melted, no volume was added so the overall amount of water was not affected.

- The land ice however was not included in the original measurement of the water which contained the sea ice. Therefore, when it melted off of the “land” and dripped into the water, it added volume. This is why our “ocean” rose a total of .4 cm in just 20 minutes.

- This concept can be applied when looking at the global warming phenomenon in relation to how it will affect our oceans.

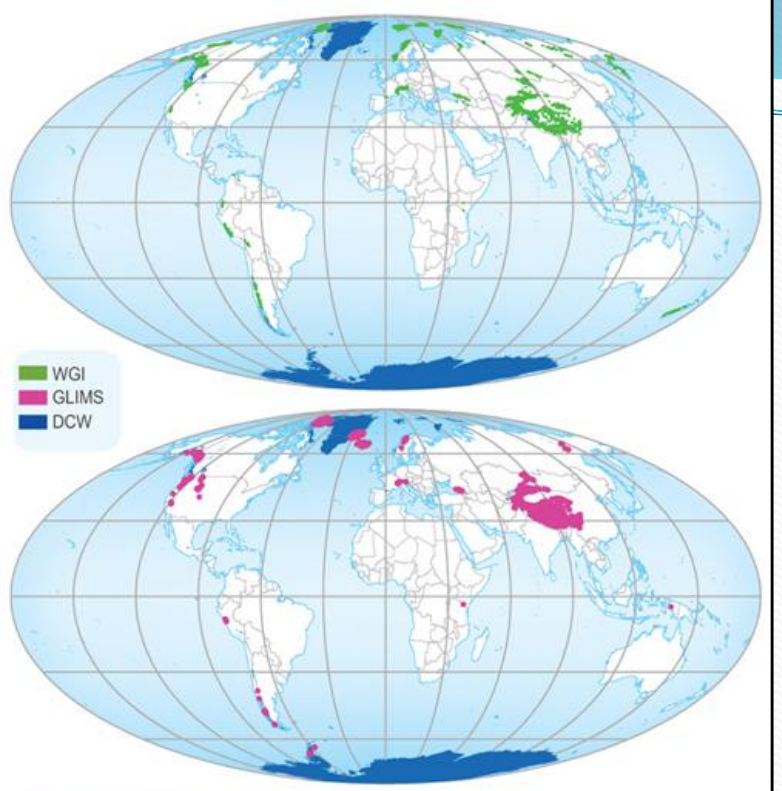


Fig. 3.6 Global glacier inventories

Measurements from Space (pink), and the Digital World Chart (blue).

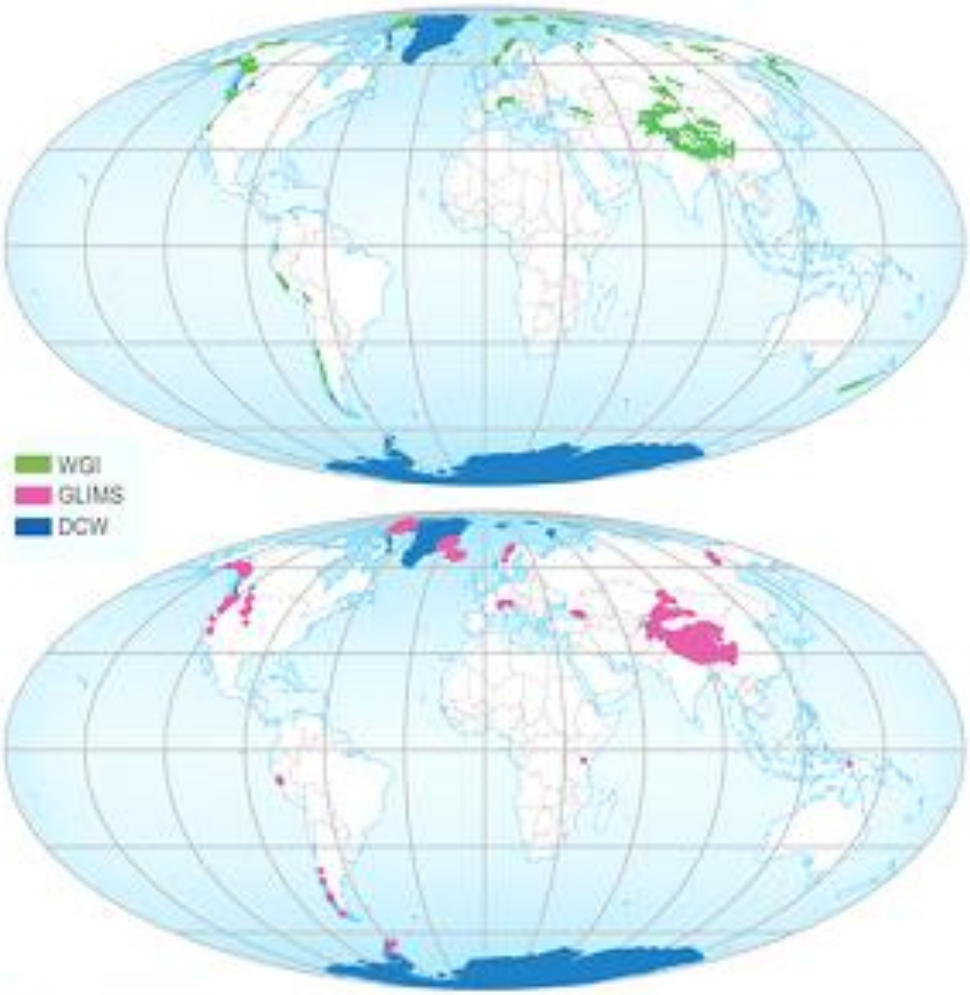


Fig. 3.6 Global glacier inventories

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overnmental Panel

Cryospheric Component	Area (mio km²)	Ice volume (mio km³)	Potential sea level rise (m) [e]
Glaciers and ice caps			
- smallest estimate [a]	0.51	0.05	0.15
- largest estimate [b]	0.54	0.13	0.37
Ice shelves [c]	1.50	0.70	~0
Ice sheets			
- Greenland [			
- Antarctica [			

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Ice sheets			
- Greenland [d]	1.7	2.9	7.3
- Antarctica [c]	12.3	24.7	56.6

Suggestions

- In conducting this experiment again, it could be suggested that the heat lamp is placed at a strategic angle that better imitates the suns position on major spots of land ice. This would help students to understand the real-life scale of this phenomenon. For further study, a group of students may look at how high sea levels may rise as a result of melting land ice and which low sea level cities and countries would be affected first and the consequences that would have for the rest of the world.