NEWS.

AN UNDERWATER WALL: THE SOLUTION TO SEA LEVEL RISE?

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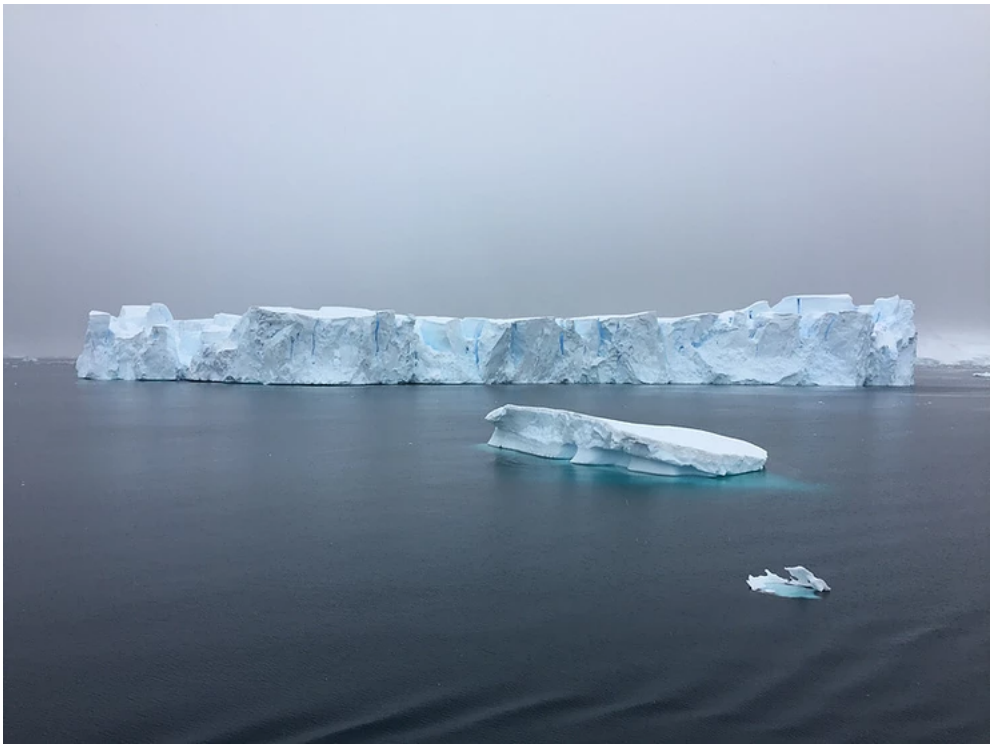

It seems like not a year goes by without coast-dwelling homeowners hearing about threats to their property due to encroaching sea levels. Those threats are usually linked to global warming and melting polar ice sheets. Now scientists have proposed a new approach to keep the effects of sea level rise at bay, and it involves a massive wall submerged at the base of the West Antarctic Ice sheet.

More often, methods to mitigate sea level rise have promoted the decrease of harmful greenhouse gas (GHG) emissions into the air, which in turn helps decrease the effects of global warming. While in the short-term this may be a more cost-effective and immediate way to tackle the problem, society may want to consider a long-term back-up plan to prepare for possible ice sheet collapse[i]; losing major ice sheets means the Earth warms faster, and we lose even more ice to melting. This can lead to habitat loss and an increased risk of major flooding.

In a paper recently published in *The Cryosphere*, scientists Michael Wovolick and John Moore, from Princeton University and Beijing Normal University, highlight a possible long-term option that would attempt to do the impossible. The proposed glacial geoengineering model describes a wall or "artificial sill" that would ultimately allow a floating glacier to reattach to the ice sheet by blocking warm waters that threaten to melt it away. In this case, the focus is on the Thwaites Glacier, a vital part of West Antarctica.

The melting of the Thwaites Glacier is considered the biggest contributor to projected rising ocean levels.[ii] In fact, researchers have used satellite imagery collected from over a 20-year span to track the rate of ice loss from the Antarctic Ice Sheet. The amount of ice lost between 1992 and 2017 alone would result in ocean levels rising about 8-millimeters.[iii] Additionally, Moore and Wovolick believe that the glacier is already plagued by Marine Ice Sheet Instability (MISI), a type of dynamic feedback that can cause a rapid collapse of the grounding line (where the ice lifts off the bedrock and floats).

The proposed wall would not only keep out warm water, but it would also provide support for the glacier which could help counter mechanisms such as MISI.[iv] To picture this, imagine a large pile of gravel, sand, and other substances that stretched for miles on the ocean floor where the ice shelf ends. This blockade would give the glacier the opportunity to reground, or reattach to the bedrock, as warmer water would be unable to reach the base of the ice sheet; this would reduce the glacier's melting.[v] Their models showed that the effectiveness of the artificial sill was dependent upon its size. Smaller sills had a 70% success rate when half the warm water was blocked and 90% when all warm water was blocked; larger sills had a 100% success rate.[vi]

Considering the sheer size, structural make-up, and position of the Thwaites Glacier, this project would no doubt take an enormous amount of human power and resources. For us, this may seem like an interesting idea too vast to try. But for world citizens 100 years from now, the consequences of not preparing for the worst can be catastrophic. Unless extensive advancements in coastal protection methods are made, future generations face the possibility of being forced inland due to loss of coastal communities and short-term flooding.[vii]

This concept provides an option when it comes to dealing with sea level rise. However, some believe that a geoengineering project of this magnitude is not ready to be attempted anytime soon. Manmade technologies have only advanced so far and taking on something like this could push us to the edge of our technological limits, but large-scale environmental problems can require large-scale thinking. There is hope that innovative solutions such as this may transcend those limits bringing society one step closer to solving this issue.

In the meantime, Moore and Wovolick reassure readers that their model in no way replaces

our priority to control GHG emissions in our present day as those emissions will affect climate well into the future.

#sealevelrise #climatechange #UnderwaterWall

References

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