

How Climate Change is Affecting Our Ocean Friends

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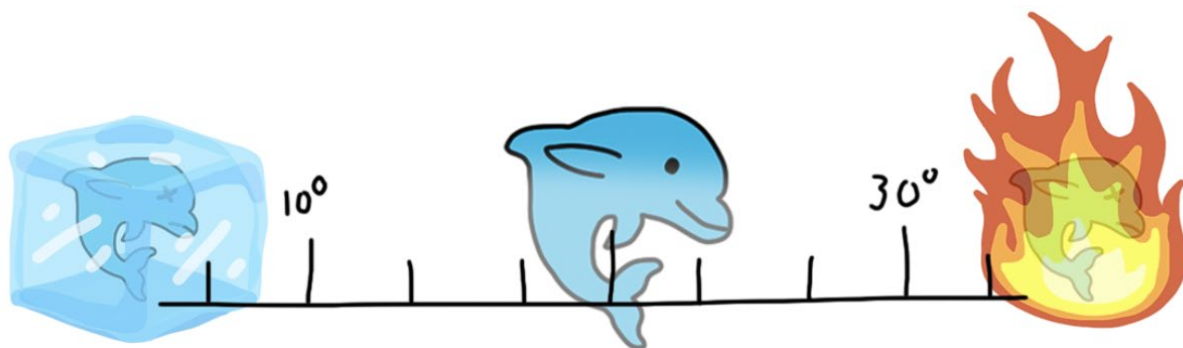
For the past 30 years, Scientists around the world have almost unanimously agreed that climate change is one of the largest, if not THE largest, global threat to the future health of our planet. In the past couple of decades, we have been taking more steps to counteract climate change. Even so, we are still not doing enough. Every day we still see new studies showing the active effects of rising global temperatures that are only going to worsen.

Our oceans are one of the subjects that often get brought up with climate change. Oceans cover about 70% of our planet so it only makes sense to see some alarming signs.

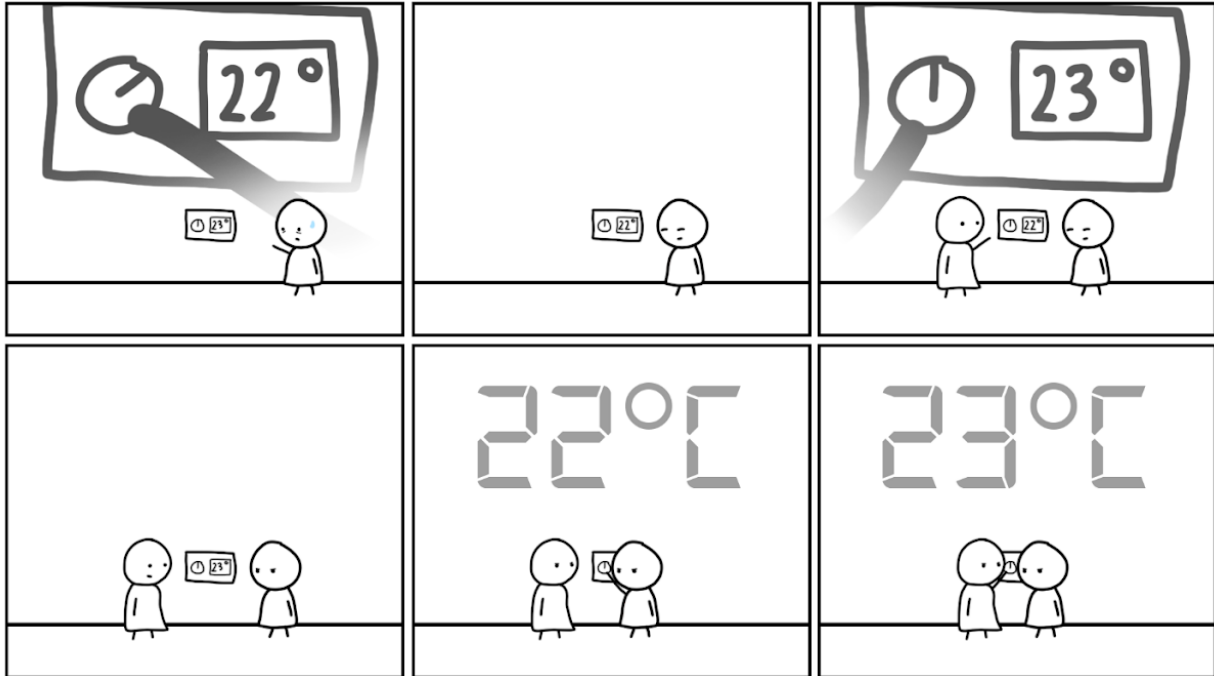
Today, I'd like to introduce you to the findings from a recent study named "Climate Change Drives Poleward Increases and Equatorward Declines in Marine Species". In this study, scientists from Bristol, Exeter, and Cambridge, UK, looked at how marine life has been affected by climate change. They performed a global-scale analysis of different marine species. What they found could spell disaster for the future of many marine animals and ecosystems.

Life can be delicate, and this can be especially true for marine life. Most species in the ocean have what scientists call a *Temperature Range*. What this means is there is a lower and upper limit in temperature that an animal can live in. If they go outside of this range, they are likely to die after long exposure.

Let us look at dolphins as an example. Dolphins can live in surface water temperatures from 10° to 32°C. While they could survive for some time outside this range, they likely cannot live for long periods of time at those temperatures.

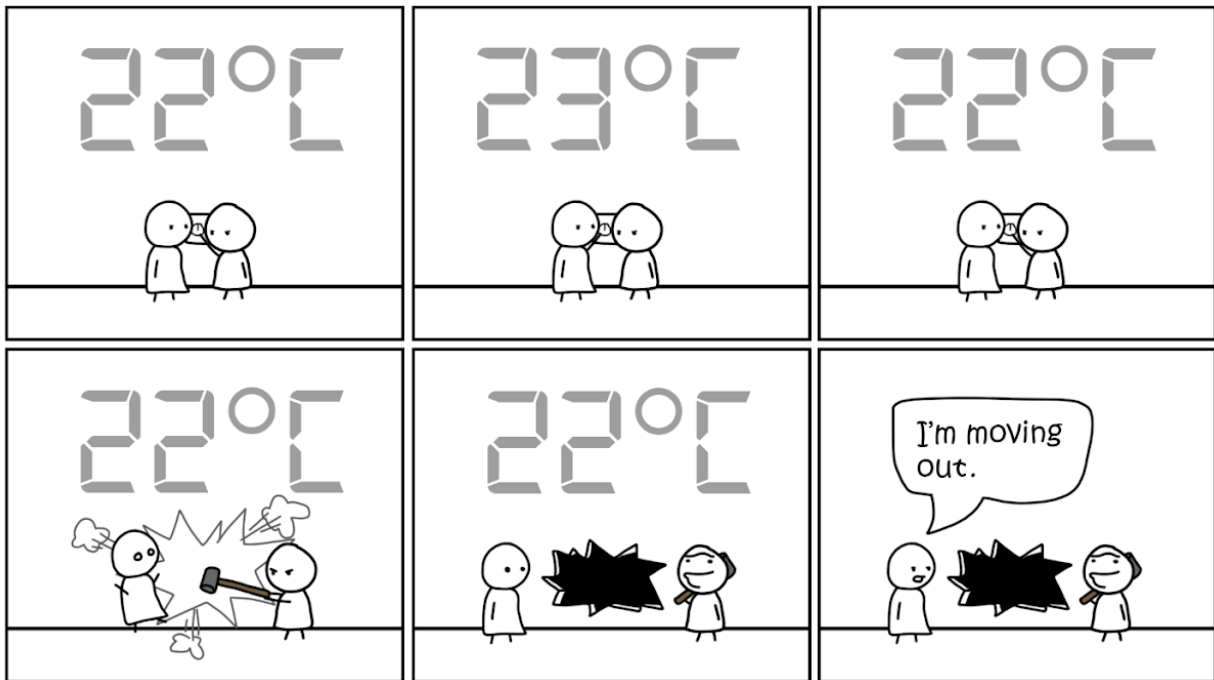


Now what scientists found is that our oceans and lakes have increased in temperature by about 1°C since the preindustrial era (before the 1850s). 1°C doesn't seem like much right? Well, when we look at temperature ranges, 1°C could be the difference between life and death.



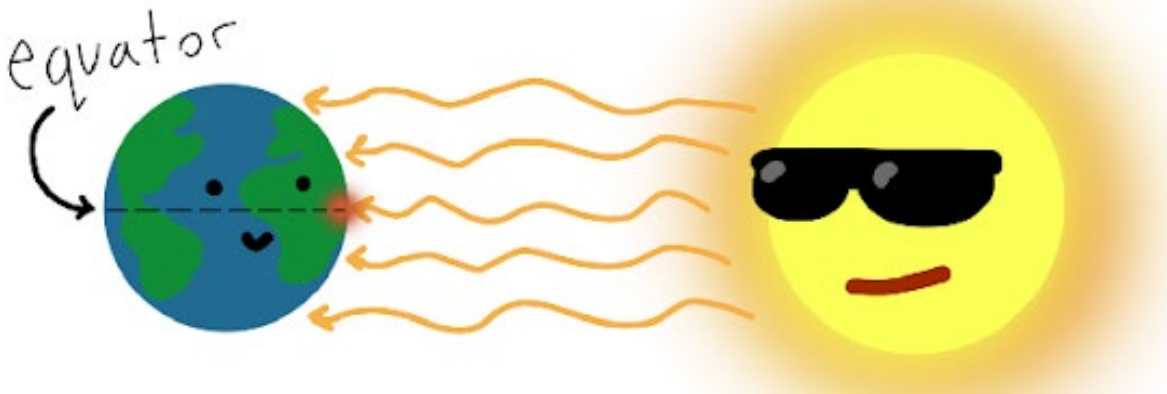
If the global ocean temperatures rose 1°C, then some parts of the ocean that our dolphins could originally live in, would now become uninhabitable. So, what's the obvious choice for our dolphin to make?

Move away.



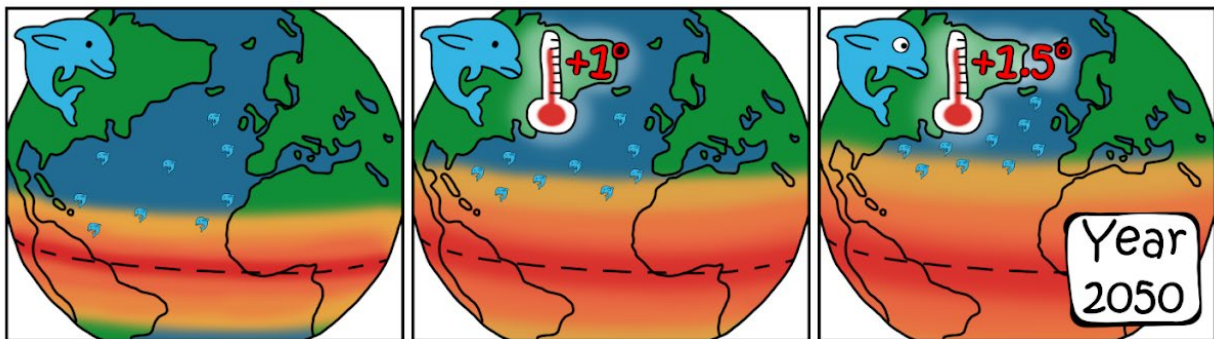
Moving away from the equator makes the most sense. The equator is the hottest area on the planet due to its direct exposure to sunlight. Because of this, areas closer to the equator are likely to be

part of the hotter end of a species temperature range. As you move away from the equator, light becomes more spread. As you get closer to the poles you get less direct sun, meaning cooler.



Moving away from the equator is in fact the behavior that researchers in our study observed. Over a wide range of marine species, the species with longer lifespans and less temperature adaptability were seen moving away from the equator, towards the poles. These species are slower to evolve and cannot quickly adapt to the rising temperatures.

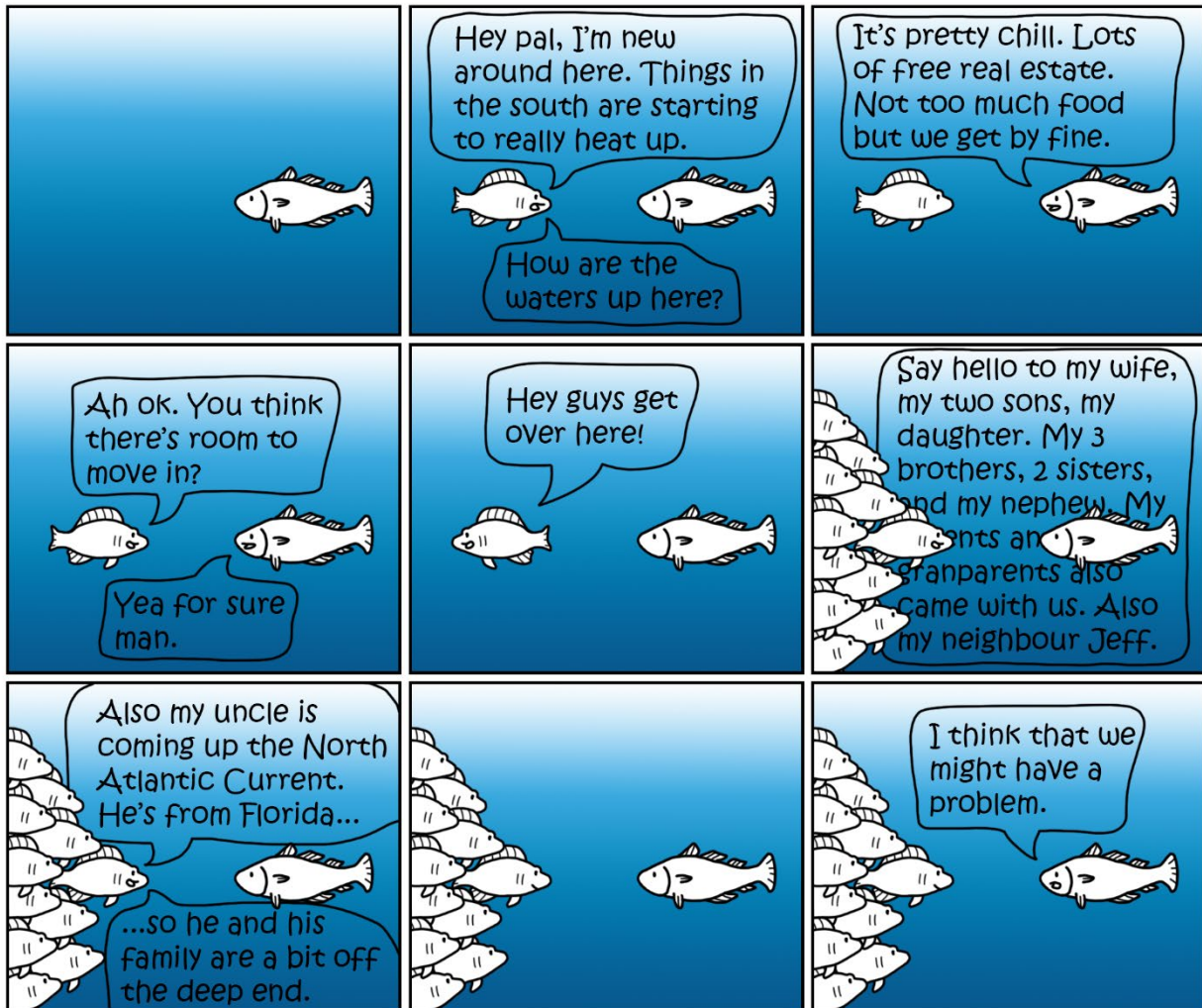
As temperatures continue to rise, this behavior will only become more evident across more species of invertebrates, seabirds, mammals such as dolphins, and almost all fish species. Scientists predict that by 2050 the ocean temperatures will rise to $+1.5^{\circ}\text{C}$ since before the 1850s.



So why is this a problem? Animals will either adapt or move away, right?

The long-term effects are hard to grasp now, but we have some good ideas about what will happen.

For one, the diversity of life near the equator will decline. Entire species will fall victim to the rising temperatures or travel to cooler waters. These ecosystems with declining populations would greatly suffer. Each ecosystem maintains a healthy balance with the existence of all the species that live within.



For example, think about the predator and prey relationship. If smaller fish can no longer survive under the new conditions, then they may relocate. Larger fish would lose a food supply and would have to follow the food. The larger mammals that may feed on these larger fish would have to do the same. This would cause dramatic changes in the food chain of an ecosystem.

As humans we are also a part of that food chain. If fish populations decline and completely disappear from some regions, this would have a huge impact on our fishing industries. Many coastal countries rely on fishing as their main resource of food and exports. Fish is actually the main source of animal protein for about 1 billion people around the world. With supply vanishing, these regions would fall into economic collapse and many people could die of starvation.

Also consider how this would affect the distribution of a species. Take the dolphin comic further up. You can see that as the population gets pushed further north by the temperature increases, the dolphins get closer and closer together. An overabundance of a species in a smaller area could lead to overall population decline. Food would become more and more sparse.

Sea surface temperatures will continue to rise. The frequency of heat waves will continue to increase. We cannot ignore the effects climate change continues to have on our oceans. Collectively we

can work towards improving our carbon emissions. Together we can truly make a difference and slow the rate of climate change. If we continue to neglect this threat to our oceans, to our planet, we will risk losing many species forever.

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