EPICENTERS OF CLIMATE AND SECURITY: THE NEW GEOSTRATEGIC LANDSCAPE OF THE ANTHROPOCENE

June 2017

Edited by:
Caitlin E. Werrell and Francesco Femia

THE CENTER FOR CLIMATE AND SECURITY

Sponsored by:

skoll global threats fund

In partnership with:

Carnegie Mellon University
Civil and Environmental Engineering

SCHOOL OF GEOGRAPHY AND THE ENVIRONMENT
UNIVERSITY OF OXFORD

Energy Science Technology & Policy
Carnegie Mellon University
College of Engineering

ASP
American Security Project

Planetary Security INITIATIVE

Atlantis 2.0: How Climate Change Could Make States Disappear – and What That Means for Global Security

Andrew Holland[1] and Esther Babson[2]

Introduction

In the Fourth Century B.C., Plato wrote of how the great city of Atlantis was submerged beneath the ocean as punishment by the gods for becoming corrupt and greedy. In Plato's telling, an advanced civilization was lost forever in a single day because its people had strayed from the will of the gods. Since then, the story – whether based in historical truth or only a lesson in morality – has captivated generations. Now, 2300 years later, the world may be facing a new Atlantis, as sea level rise – caused by climate change – is threatening to inundate civilizations again.

The threat is global, but it is not shared equally. Like most of the effects of climate change, those most harmed by it are the populations with the fewest resources. At first, the greatest impacts will be felt by those living on low-lying islands like Kiribati and the Marshall Islands in the Pacific or the Maldives in the Indian Ocean. Life is difficult enough on these small islands, surrounded by the vastness of the ocean, without adding the challenges of sea level rise, more dangerous extreme weather, and the loss of food and fresh water resources.

Unlike Plato's Atlantis, however, the threat to small islands is easily predictable, if not preventable. Thankfully, we don't expect the islands to disappear in "a single day and night of misfortune" as Plato said of Atlantis' fate.[3] Allowing for some uncertainty, we know how sea level rise has accelerated on these islands over the past century, and we can predict the impacts. However, the effects will not be limited to only the small population of people living on islands. Alone, their economic and geopolitical

significance is miniscule. But, great powers remain interested in the strategic value of islands, and sea level rise will present a series of tests to them about how to manage conflicts. In the near term, the fate of small islands will present a series of "mini crises" about how and where to relocate peoples and societies, and who retains control of the resources they once owned. But, how the world manages those crises will offer a preview of how the world will respond to the far greater challenges that may lie decades hence; for one day, our civilization's great cities may face the same fate Atlantis did.

Climate Change is Already adding to Risk on Small Islands

The science leaves no question that the Earth's climate is changing, and the seas are rising as a consequence. Since 1951 temperatures have risen by at least .72ºC, and within the past decade, sea levels have risen at a rate of at least 2.8 mm/year.[4] While the entire globe will be impacted by climate change, small island states have become a "poster child" for climate change. For good reason: small island states with large populations near sea levels have already seen rates of sea level rise four times higher than global averages.[5]

This higher rate is due to a few factors, such as winds and gravity, that create regional differences in sea levels around the globe. For example, winds blowing in one direction move water the same way, creating higher sea levels in the direction the wind blows. A similar concept can be applied to ocean currents with a slower current leading to a "pile up" of water. Gravity also plays a major role in shaping sea levels. Whether they are polar ice sheets or a mountain range under the ocean, these features have additional gravitational force and, therefore, can draw more water towards them, creating a bump on the surface.[6] Finally, Earth's rotation creates a bulge around the equator as the middle of the Earth must move faster than the poles to complete a revolution in the same amount of time.[7]

All this means that different places around the world will see differing amounts of sea level rise, depending on location. Many of the most vulnerable islands are on the equator, leading to a naturally higher sea level to begin with. In the Maldives and Tuvalu, 100% of the population lives less than 16 feet above sea level.[8] Within the Marshall Islands and Kiribati, over 95% live below that mark.[9] With just 3 feet of sea level rise, the Maldives are likely to be submerged.[10]

Clearly, continued increases in sea level will have disastrous effects. Even if island nations aren't completely pushed beneath the waves, there are significant consequences. Islands are already seeing increased coastal inundation, erosion and even community displacement as the rising seas eat away at their land. Rising tides threaten to flood fresh water reserves with salt water. At the same time, a recent drought in the Marshall Islands caused more than 16,000 people to suffer from food and water shortages.[11]

The ocean itself is also affected by increasing temperatures. Growing ocean acidity and warming water have resulted in serious concern about the stability of coral reefs – and declining coral health undermines island communities because the reefs provide a source of food and income, as many are reliant on fish sales and tourism. Coral reefs have the added benefit of acting as a natural barrier against storm surges. Unfortunately, the impacts of a warmer ocean are already visible in many nations. Kiribati has seen unprecedented bleaching events with some islands seeing 100% coral mortality within the lagoons.[12]

Changes in human systems are equally apparent within many small island nations. Shifting biodiversity ranges, decreasing freshwater due to saltwater intrusion, changing precipitation patterns, more coastal development, and increasing incidence of diseases are all currently observed impacts.[13] Future trends are likely to only expand and multiply.

Prospective Risks for the Future

While modeling for islands is incredibly difficult due to scale, predicted trends are not optimistic. Even with a decrease in emissions today, the climate will continue to warm into the future. Predictions vary by region but studies suggest a 1.2ºC to 2.3ºC increase in temperatures by 2100.[14] Such an increase will result in serious consequences for the future of these islands. Estimates suggest that sea levels could rise up to 3 feet by 2090, submerging Kiribati, Tokelau, and Tuvalu.[15]

Many of the phenomena occurring already will accelerate.[16] In addition to rising seas, extreme precipitation is expected to increase, with both floods and droughts becoming more common. Increasing storm surges on already higher oceans will leave coastal communities at risk. If greenhouse gas (GHG) emissions continue to increase, the consequences will be far greater. A catastrophic melting of Greenland alone would result in about 6 feet of sea level rise, easily submerging entire cities and countries.[17]

As the impacts of climate change become more and more pronounced, secondary and tertiary consequences will begin to unfold. Due to the high dependence on reefs as a source of revenue, livelihoods will be threatened by the increasing level, temperature and acidity of oceans. Beyond loss of property and livelihood, one of the greatest concerns is complete loss of country. Rising seas will not submerge all islands, but many are severely threatened by even a meter of sea level rise. Where will these people go? What will happen to their submerged territory? And who will care enough to do anything about it?

What Happens to the Inhabitants?

Because of the inexorable nature of sea level rise, for many of the islands the best hope is not to protect the land with new sea walls, but to undertake controlled migration away from the islands. That will mean finding ways for people to move to new islands within the country or to new land in a new country. The president of Kiribati has announced an arrangement to buy land in Fiji.[18] That land is now being used to produce food for the inhabitants of Kiribati, but one day it could provide a new homeland. Such a controlled migration – which the Kiribati government calls "migration with dignity" – is unique in that it amounts to a government planning its country's demise. This process depends on foresight by the government, extra resources to buy the land, and a willing seller. Unfortunately, those aren't always paired in poor countries with weak governance.

Instead, what we should expect is more uncontrolled migration from island to island, to cities, and developed countries. This could play out similarly to Australia's asylum policies, which have pushed the country to turn boats away and detain migrants in offshore processing centers in countries such as Nauru and Papua New Guinea. It is a high-profile humanitarian disaster. When migrants are forced from their homes in an unplanned manner. The evidence suggests that this acts as a trauma that can undermine their long-term quality of life.[19]

Clearly, the better alternative is to attempt to replicate the Kiribati alternative as closely as possible. The society must debate how to adapt, whether through migration or coastline protection, then plan for it in an organized way and execute the plan together. Unfortunately, the realities of migration mean that decisions about when and where to migrate are usually made at the individual or family level. Seldom do entire communities pick up and move – and even when entire communities are physically removed, their lives are forever altered.

What Happens to the Resources?

Countries are afforded territorial rights to resources within their borders under customary international law. For islands, the relevant portion of law is the United Nations Convention on the Law of the Sea (UNCLOS), which codifies rights to resources within what is called an "Exclusive Economic Zone" (EEZ). These can be sub-sea deposits such as oil or natural gas, or resources such as fisheries that exist within the sea itself. Under Article 21 of UNCLOS, an island is entitled to an EEZ extending 200 miles into the sea, from a baseline point that is always above sea level. However, they must be considered an island and not just a "rock." A rock is defined as a place "which cannot sustain human habitation or economic life of their own."[20] Rocks, therefore, are not eligible to have a surrounding EEZ or territorial waters.

As the seas rise, we could see portions of countries change from "islands" under international law, to "rocks." They do not even need to become permanently submerged, only incapable of sustaining "human habitation or economic life." One potential scenario could be previously habitable islands losing their fresh water sources due to salt-water intrusion. Fortunately, it seems that the architects of the Convention gave some thought to the problem of shifting baselines, stating under Article 7 that, if a baseline is drawn in accordance with the rules of the Convention, and the lines are submitted and publicly disclosed, then the baselines are deemed permanent until changed.[21]

This would imply that the threat of sea level rise is not a threat to a nation's EEZ, so long as the nation remains. However, that raises a bigger question: if a country ceases to have any land, does it cease to be a country? And, if it ceases to be a country, what body retains the rights to the resources within the EEZ?

There is little precedent for this within international law. In the past, countries have willingly ceded their rights to territory, and their very existence, to another country; East Germany joined the Federal Republic of Germany to become a single German state in 1990. Or, is this a case more akin to the lawfully elected governments of many European states during World War II reconstituting themselves as "governments in exile" in London. If, for example, the government of Kiribati moved its people and leadership to its purchased land in Fiji, would it remain a full Member of the United Nations General Assembly? Would it maintain rights to the resources within its EEZ? Would it be a country? Or would these people simply be migrants to Fiji? The answers to questions like these are not obvious, and are fraught with moral and legal permutations.

These questions of international law would seem to make for an interesting academic exercise, aside from the fact that they present very real challenges for those living through these challenges.

The Geopolitical Implications of Lost Islands

In recent years, there has been a significant increase in funding from China to the South Pacific, an area traditionally dominated by aid from New Zealand, Australia, and the United States.[22] In 2014, Chinese President Xi Jinping made a state visit to Fiji to herald a closer relationship. China's efforts in the South China Sea show how much the country values sea borders and maritime control.

There are several geopolitical reasons for the great powers to compete over influence and access to resources.

The first is the global power of many voices speaking as one. Founded in 1990 as the voice of the Small Island Developing States in debates concerning climate change, the Alliance of Small Island States (AOSIS) has become a key voice in international climate forums, far outreaching their small population size and economic status. Together, the AOSIS includes 44 states, of which 39 are independent nations with voting status in the UN General Assembly. As China becomes a stronger global player, they have made efforts to portray themselves as a leader of developing countries. By courting favor with this bloc, China could bring a strong voice, with many General Assembly votes, to their side.

Secondly, great powers have recognized the military importance of island bases for centuries. Since the Second World War, the United States has built military infrastructure around the world on islands that now are at risk from sea level rise. Diego Garcia in the Indian Ocean, for example, is a critical logistics hub for the U.S. and U.K. militaries in the Middle East. On Kwajalein, an island in the Marshall Islands in the Pacific, the United States has invested billions of dollars into significant radar and ballistic missile defenses. Furthermore, both Kwajalein and Diego Garcia are used as ground stations assisting the operations of the Global Positioning System (GPS) navigational system.[23] A sea-level rise of several feet would cause the American military to lose geographically strategic outposts around the world.

Conclusion –A Risk not Limited to Small Islands

If the plight of the small nations of Kiribati, the Marshall Islands, or Tuvalu do not rise to the level of great geopolitical crisis, perhaps we should argue instead that they are the canaries in the coal mine. These problems are not unique to small, poor island nations. It is only that they will be forced to deal with them first. Already, in the United States, communities in coastal Louisiana and northern Alaska are reckoning with moving their entire towns because of sea level rise and coastal erosion. The costs are significant.

Not far down the line, however, the great metropolises of the world face similar threats. In the United States, cities such as Miami and New Orleans face an existential threat from sea level rise. Likewise, the low-lying Pearl River Delta region of China, around which China's economic powerhouses of Hong Kong, Shenzhen, and Guangzhou are clustered, could see vast swaths of its land submerged. This is not inevitable: prompt action to slow global warming and stop polar ice melt could save these cities. But, if the world fails at the relatively easy and predictable coordinated challenge of evacuating small islands, and solving their legal challenges, we should be pessimistic about solving the real challenges of Atlantis 2.0 that could come decades later.

Notes

1 Director of Studies and Senior Fellow for Energy and Climate, The American Security Project

2 Program Manager for Climate Security at the American Security Project

3 Plato, *Critias*, http://classics.mit.edu/Plato/critias.html.

4 J.H. Christensen, K. Krishna Kumar, E. Aldrian, .F.A. Cavalcanti, M. de Castro, W. Dong, P. Goswami, A. Hall, J.K. Kanyanga, A. Kitoh, J. Kossin, N.C. Lau, J. Renwick, D.B. Stephenson, S.-P. Xie and T. Zhou, *2013: Climate Phenomena and their Relevance for Future Regional Climate Change*. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

5 Climate & Development Knowledge Network, "The IPCC's Fifth Assessment Report: What's in it for Small Island Developing States?," Overseas Development Institute and Climate and Development Knowledge Network, 2014. http://cdkn.org/wp-content/uploads/2014/08/CDKN_IPCC_Whats_in_it_for_SIDS.pdf.

6 Michael Lemonick, "The Secret of Sea Level Rise: It Will Vary Greatly By Region," Yale Environment 360, March 22, 2010. Accessed at http://e360.yale.edu/feature/the_secret_of_sea_level_rise_it_will_vary_greatly_by_region/2255/.

7 Jeannie Evers(ed.), "Encyclopedia: Equator," National Geographic, 2011, http://nationalgeographic.org/encyclopedia/equator/.

8 United Nations Office of the High Representative for the Least Developed Countries, "Small Island Developing States (SIDS) Statistics," Accessed at http://unohrlls.org/custom-content/uploads/2013/09/Small-Island-Developing-States-Factsheet-2013-.pdf.

9 Ibid.

10 Brenda Ekwurzel, "Climate Hot Map: Republic of Maldives," Union of Concerned Scientists. Accessed at http://www.climatehotmap.org/global-warming-locations/republic-of-maldives.html.

11 Sally Adnrews, "Drought in the Marshall Islands," The Diplomat, February 16, 2016. Accessed at http://thediplomat.com/2016/02/drought-in-the-marshall-islands/.

12 L.A. Nurse, R.F. McLean, J. Agard, L.P. Briguglio, V. Duvat-Magnan, N. Pelesikoti, E. Tompkins, and A.Webb, 2014: Small islands. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [V.R. Barros, C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L.White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1613-1654.

13 Ibid.

14 Ibid.

15 Rob Taylor, "Pacific Islands Take Steps to Counter Rising Sea Levels," The Wall Street Journal, December 1, 2015. Accessed at http://www.wsj.com/articles/pacific-islands-take-steps-to-counter-rising-sea-levels-1448934453.

16 IPCC, 2014: *Climate Change 2014: Synthesis Report*. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp1-32).

17 National Snow & Ice Data Center, "Quick Facts on Ice Sheets,. Accessed at https://nsidc.org/cryosphere/quickfacts/icesheets.html.

18 Laurence Caramel, "Besieged by the rising tides of climate change, Kiribati buys land in Fiji," The Guardian, June 30, 2014. Accessed at https://www.theguardian.com/environment/2014/jul/01/kiribati-climate-change-fiji-vanua-levu.

19 David Palmer & Kim Ward, "'Lost': listening to the voices and mental health needs of forced migrants in London," *Medicine, Conflict and Survival*, 23 (3) (07/01): 198-212.

20 United Nations Convention on the Law of the Sea, *Part VIII Regime of Islands: Article 121 Regime of Islands*. Accessed at http://www.un.org/depts/los/convention_agreements/texts/unclos/part8.htm.

21 Charles Di Leva & Sachiko Morita, "Maritime Rights of Coastal States and Climate Change: Should States Adapt to Submerged Boundaries?" Law & Development Working Paper Series no.5. Accessed at http://siteresources.worldbank.org/INTLAWJUSTICE/Resources/L&D_number5.pdf.

22 Grant Wyeth, "What to Make of China in the South Pacific?," The Diplomat, September 29, 2016. Accessed at http://thediplomat.com/2016/09/what-to-make-of-china-in-the-south-pacific/.

23 United States Air Force, "GPS," 2016. Accessed at http://www.gps.gov/systems/gps/control/.