

# **THE CHANGING GEOGRAPHY OF THE CHINA SEAS AND THE INDO-PACIFIC**

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The China Seas and the Indo-Pacific are located in the world's most densely populated region. Their geography is home to numerous archipelagos, with Indonesia being the largest (in fact, it is the largest archipelagic state in the world). Also situated in the area is one of the most heavily trafficked maritime passages, such as the Strait of Malacca. Over the past years, many small islands within these archipelagos, as well as reefs and shallows, have witnessed constructions that significantly increase their surface area. On the other hand, and also as a consequence of human activities, there are places that have been invaded by the sea, including small islands in some cases and sectors of large urban areas in others. These changes raise questions, particularly regarding the future application of laws and treaties, such as the United Nations Convention on the Law of the Sea (UNCLOS).

Keywords: Geography – Seas – China – Global warming - UNCLOS

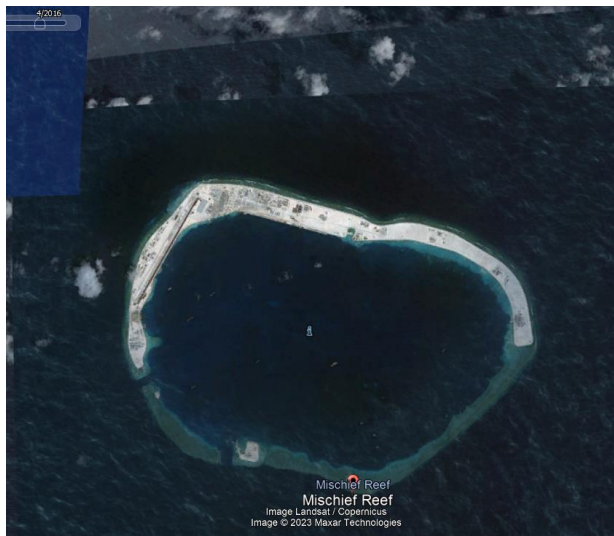
Computer tools are evolving at a surprising pace. Until the end of the 20<sup>th</sup> century, computers were rudimentary and capable of only basic operations. Moreover, they were not interconnected. Today, on the other hand, we can connect limitlessly and observe what is happening in the world comfortably from our desktop, even visually, as if we were at a great height. One of the most widely used applications to achieve this is Google Earth, which not only allows us to navigate while observing the Earth's surface from above but also provides the opportunity to “travel through time,” offering views of how our places of interest looked on multiple dates. So, shall we take a stroll through the China Seas and the Indo-Pacific? In addition, while we are at it, let us examine the changing geography of many places in the mentioned region.

First example. Mischief Reef is (or rather, was) a shoal that surfaced during low tide, located 125 nautical miles off the coast of the Philippines. Therefore, according to the United Nations Convention on the Law of the Sea (UNCLOS - Montego Bay, Jamaica, 1982), it falls within the Exclusive Economic Zone (EEZ) of the Philippines. It is de facto administered by the People's Republic of China (PRC), which asserts sovereignty claims in the area, as do Taiwan, Vietnam, and the Philippines. Its appearance in 2004 was as follows:



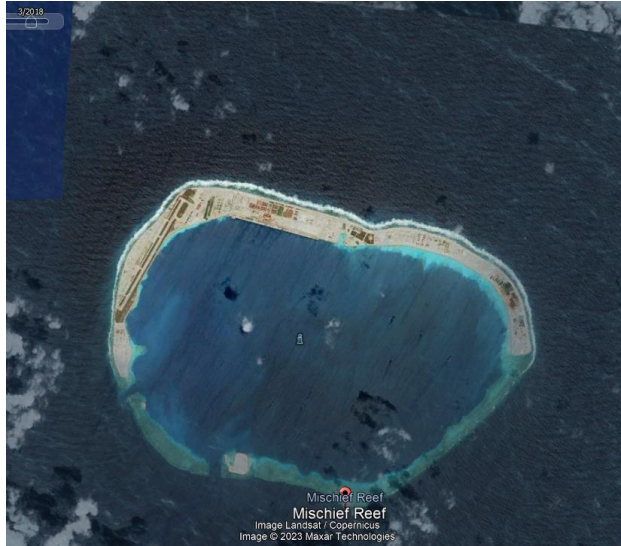
**Mischief, December 2004.**  
**Source: Google Earth**

Over time, China's presence in the area increased, initially constructing structures on stilts that were declared as “shelters for fishermen.” In 2016, it looked like this:



**Mischief Reef, April 2016.**  
**Source: Google Earth**

The “urbanization” (to call it something) of the place is notable, transforming the area. However, the metamorphosis continued, and by March 2018, the view from above was as follows:



**Mischief Reef, March 2018.**  
**Source: Google Earth**

The images reveal a significant change in the geography of the area, artificially brought about by the PRC, including facilities such as docks, airstrips, underground storage for ammunition and other materials, hangars and missile shelters, as well as radar and communication installations.

Another place that, thanks to Google Earth, anyone can “visit” is Subi Reef. Located 230 nautical miles off the coast of the Philippines (outside its EEZ); it is part of the Spratly Archipelago. It is also de facto administered by China, which claims sovereignty, as do Taiwan, Vietnam, and the Philippines (in the latter case, due to its proximity to the Philippine island of Thitu). If one could have flown over the area in 2005, the view would have been as follows:



**Subi Reef, December 2005.**  
**Source: Google Earth**

Apparently, nature was untouched until then. However, fast-forwarding to April 2015, the panorama looked like this:



**Subi Reef, April 2015.**  
**Source: Google Earth**

Continuing an imaginary journey through time, by 2021, one could observe something like this:



**Subi Reef, March 2021.**  
**Source: Google Earth**

The changes in Subi were also a result of the actions of the PRC, which incorporated features such as docks, airstrips, and defense points. According to the Asia Maritime Transparency Initiative (AMTI)<sup>1</sup>, there are four structures on Subi Reef that appear to serve as defense points for the placement of weapons and probable CIWS ("Close-In Weapon System" - an acronym referring to point-defense anti-aircraft systems). It is presumed that these batteries would be the last line of defense against cruise missiles, complementing a kind of "defensive umbrella" provided by a future deployment of long-range surface-to-air missiles to the area. The mentioned organization has concluded that Beijing has developed at least seven artificial islands, creating 1,295 hectares of new land from 2013 to the present<sup>2</sup> on the Spratly

<sup>1</sup> Asia Maritime Transparency Initiative. <https://amti.csis.org/>

<sup>2</sup> Asia Maritime Transparency Initiative. <https://amti.csis.org/island-tracker/china/>

Islands (Mischief, Subi, Cuarteron, Fiery Cross, Gaven, Hughes, and Johnson) and in the Paracel Islands.

However, Mischief or Subi are not the only places in the region where what were once tidal shoals or reefs later transformed into structures housing military or mixed bases. Nor is the PRC the only country building logistical and military facilities on them. According to the aforementioned source, five countries occupy around seventy reefs and islets in the South China Sea, having built a total of more than ninety outposts or facilities, generally in expansion, all in places whose possession or sovereignty is disputed. The details are as follows:

Malaysia occupies five spaces in the Spratly Islands, grouped in the southern part of the archipelago. These are the reefs Ardasier, Erica, Mariveles, and Swallow, in addition to the Investigator Shoal (which surfaces at low tide and has been “urbanized”).



**Investigator Shoal, June 2014.**  
**Source: AMTI**

The Republic of the Philippines, on its part, occupies nine spaces in the Spratly Islands. The largest is Thitu, a rock of which the Philippines took possession in 1974, hosting the only Filipino airstrip in the area. The permanent population consists of around a hundred civilians and a small military garrison.



**Thitu Island, Philippines.**  
**Source: AMTI**

In the case of Taiwan, the sole outpost in the Spratly Archipelago is on Itu Aba Island. While efforts have been made to preserve the surrounding coral reefs, Taiwan constructed an airstrip and a pier, completed by the end of 2015.



**Itu Aba Island, Taiwan.**  
**Source: AMTI**

Vietnam occupies between 49 and 51 outposts (the status of two construction projects on the South Cornwallis Reef is unclear) spread across 27 locations in the South China Sea. These include facilities built on 21 rocks and reefs in the Spratly Islands, in addition to 14 platforms known as “service stations” on six banks to the southeast. Moreover, in recent years, Vietnam has created new land on eight of the 10 rocks it occupies and has expanded many of its smaller outposts on reefs and banks.



**Vietnamese “Service Station” in Alexandra Bank, 2016.**  
**Source: AMTI**

**The Alexandra Bank, located in the southern part of the South China Sea, does not surface at low tide. Vietnam took possession of the site in 1991.**

Apparently, the region of the China Seas seems to be in constant “growth.” This expression should be interpreted, as seen so far, in the purely geographical sense of the increase in occupied surface. This growth is not due to geological reasons but to human intervention for political reasons and the actions of governments in the area.

However, not everything is as such in this part of the world; there is also a reverse process. In the China Seas, the Indian Ocean, and adjacent areas in the Indo-Pacific, there are places that are slowly disappearing from the map. One of them is Tuvalu, a group of small islands located about 1,700 nautical miles northeast of Australia. While it may seem a far-off location from the disputed areas in the China Seas, it is worth noting that it is within the range of strategic weapons held by

countries in the region. For example, the Hwasong-18 missile tested by North Korea would have a range of about 15,000 km<sup>3</sup>.

Tuvalu is a parliamentary democracy that gained independence from the United Kingdom in 1978. Its limited income comes from licensing for fishing, permission to use the “.tv” suffix in internet domains<sup>4</sup>, and rents from investment funds. However, its most significant problem is not the economy but its very existence. As its highest point is only 5 meters above sea level, its surface is affected by very high tides, storms (or the combination of both), and the constant rise in sea levels due to global warming.

In this regard, Prime Minister Kausea Natano addressed the nations of the world at the United Nations Climate Change Conference (COP26) held in Glasgow at the end of 2021:

“Despite the call... to limit global warming to 1.5°C above pre-industrial levels, I want to make it clear that even if all greenhouse gas emissions were to cease tomorrow, Tuvalu and other low-lying atoll island nations are sinking, and our lands are disappearing rapidly.

Under all current emission scenarios considered, global surface temperatures will continue to rise at least until the mid-century... At this moment, 40% of the central district of Tuvalu's capital, Funafuti, is already below sea level in measurements of the highest tide. These are not future predictions; this is the reality we are living with today. We cannot wait; we must make bold decisions and act decisively to secure our future<sup>5</sup>.”

In addition, during COP 26, other officials from Tuvalu expressed their concerns, such as Simon Kofe, the Minister of Communications, Justice, and Foreign Affairs of Tuvalu. His speech had a very significant impact, among other reasons, due to the location from which he delivered it to his audience. The image is poignant:

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<sup>3</sup> Lendon, Brad y Yeung, Jessie (July 13<sup>th</sup>, 2023). North Korea says it tested an advanced solid-fueled ballistic missile. Here’s why adversaries are alarmed. *CNN*. <https://edition.cnn.com/2023/07/12/asia/north-korea-icbm-explainer-intl-hnk/index.html#:~:text=%E2%80%9CThe%20launch%20of%20Hwasong%2D18,for%20Policy%20Studies%20in%20Seoul.>

<sup>4</sup> Lee, Alexander (December 23<sup>rd</sup>, 2019). Tuvalu is a tiny island nation of 11,000 people. It’s cashing in thanks to Twitch. *The Washington Post*. <https://www.washingtonpost.com/video-games/2019/12/23/tuvalu-is-tiny-island-nation-people-its-cashing-thanks-twitch/>

<sup>5</sup> Natano, Kausea (November 2<sup>nd</sup>, 2021). Tuvalu National Statement for the World Leaders Summit. United Nations. [https://unfccc.int/sites/default/files/resource/TUVALU\\_cop26cmp16cma3\\_HLS\\_EN.pdf](https://unfccc.int/sites/default/files/resource/TUVALU_cop26cmp16cma3_HLS_EN.pdf)



**Simon Kofe, Minister of Communications, Justice, and Foreign Affairs of Tuvalu, makes a statement at COP26 while standing in the ocean. Funafuti, November 2021. Source: Ministry of Foreign Affairs of Tuvalu / Reuters.**

Tuvalu is a very small country, but, as we will see later, it can set very important precedents. What solution can its inhabitants find to continue existing? According to journalistic information, around 20% of Tuvalu's population has already relocated, many to New Zealand<sup>6</sup> under the “Pacific Access Category”<sup>7</sup> visa, which allows up to 150 citizens from Tuvalu, 150 from Kiribati, 500 from Tonga, and 500 from Fiji to obtain residency in New Zealand each year. According to the same source, Australia has offered land for relocation, but only in exchange for maritime and fishing rights, which was rejected by the Tuvalu government. Fiji, on the other hand, has offered land but is also affected by the rising sea level. All of this is happening while infrastructure projects are being developed to mitigate the effects of high tides under the Tuvalu Coastal Adaptation Project<sup>8</sup>.

Given that there is currently no provision for the protection and assistance of refugees generated by climate change under the 1951 UN Convention on Refugees, Tuvaluans are exploring other options and are concerned about losing their cultural identity. In this regard, the “Future Now Project”<sup>9</sup> proposes three initiatives. The first aims to preserve their cultural identity. The second, crucial and likely to be considered by other nations in the future, involves securing Tuvalu's statehood and maritime borders under international law in the event that its territory ceases to exist. The third suggests a partial but innovative solution: the development of a digital nation, involving the transfer of access to government and consular services, along with all accompanying administrative systems, to the “cloud.” With this approach, elections could continue to be held, and government bodies would remain operational.

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<sup>6</sup> The Guardian (June 27<sup>th</sup>, 2023). Facing extinction, Tuvalu considers the digital clone of a country. *The Guardian*. <https://www.theguardian.com/world/2023/jun/27/tuvalu-climate-crisis-rising-sea-levels-pacific-island-nation-country-digital-clone>

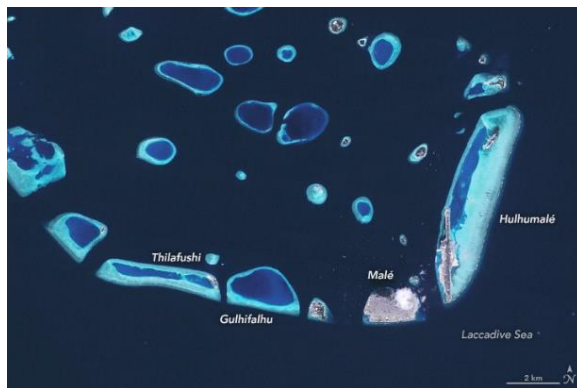
<sup>7</sup> Government of New Zealand. *Pacific Access Category Resident Visa*. <https://www.immigration.govt.nz/new-zealand-visas/visas/visa/pacific-access-category-resident-visa>

<sup>8</sup> Government of Tuvalu. *Tuvalu Coastal Adaptation Project*. <https://tcap.tv/>

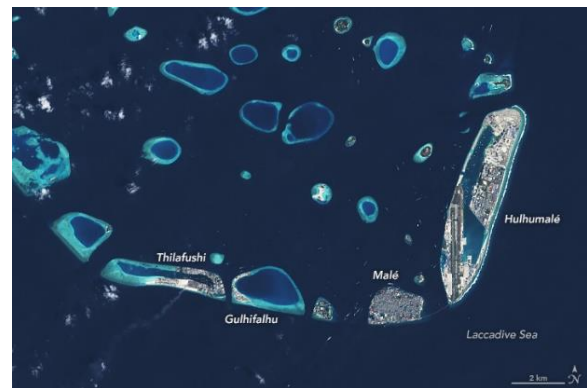
<sup>9</sup> Government of Tuvalu. *Future Now Project*. <https://dfa.gov.tv/index.php/future-now-project/>



But Tuvalu is not the only extreme case. In the Indian Ocean, the Maldives face a similar situation. According to NASA<sup>10</sup>, with 80 percent of its 1,190 coral islands less than one meter above sea level, the Maldives have the lowest elevation of any country in the world. With the average sea level rising up to 4mm per year, the lowest islands could become uninhabitable by 2050. To counteract this effect, Hulhumalé has been artificially developed, a newly constructed structure (similar to what has been done in some places in the Spratly Islands) northeast of the capital, Malé. The appearance is as follows:



**Hulhumalé, Maldives (1997)**  
**Source: NASA**



**Hulhumalé, Maldives (2020)**  
**Source: NASA**

From what has been seen so far, human activity in changing the geography of certain places, posing the risk of disappearance due to rising sea levels, primarily affects small archipelagos quite distant from the central conflict zone in the South China Sea. However, this concept is still incomplete.

As recently published by researcher Robin White in Newsweek, low-lying archipelagos are the most vulnerable to rising sea levels (mentioning Maldives, Kiribati, Tuvalu, and the Marshall Islands<sup>11</sup> in particular), which seems like an obvious truth. However, additionally, a detailed report from the U.S. Geological Survey (USGS) warns that rising sea levels not only affect infrastructure and terrestrial habitats but also render finite freshwater resources non-potable, a vital limitation for human life. It mentions places like the Carolines, Cook Islands, Gilbert Islands, Line Islands, Society Islands, Spratly Islands, Maldives, Seychelles, and some islands in the northwest of Hawaii<sup>12</sup>. However, the damage is not limited to these strategically located small archipelagos. As published by White, affected

<sup>10</sup> EOS Project Science Office. Preparing for Rising Seas in the Maldives. NASA. <https://earthobservatory.nasa.gov/images/148158/preparing-for-rising-seas-in-the-maldives>

<sup>11</sup> White, Robin (May 9<sup>th</sup>, 2023). The Countries at Risk From Rising Sea Levels. Newsweek. <https://www.newsweek.com/countries-risk-rising-sea-levels-1798331#:~:text=Pacific%20Island%20nations%2C%20such%20as,flattest%20country%20on%20the%20globe>

<sup>12</sup> Communications and Publishing, United States Geological Survey (April 25<sup>th</sup>, 2018). Many Low-Lying Atoll Islands Will Be Uninhabitable by Mid-21<sup>st</sup> Century. *United States Geological Survey*. <https://www.usgs.gov/news/national-news-release/many-low-lying-atoll-islands-will-be-uninhabitable-mid-21st-century>

areas will also include low-lying, densely populated coastal regions, many of which are around the South China Sea or the Indo-Pacific. The news article mentions Bangladesh and Vietnam, countries with populations of 167 million and 104 million, respectively. Large rivers that flow into deltas, such as the Mekong in Vietnam or the Ganges-Brahmaputra in Bangladesh, are also areas that will be affected by rising sea levels, leading to massive displacements of their populations. White, in collaboration with Zita Sebesvari, a scientist at the Institute for Environment and Human Security at the United Nations University, adds that some of the most vulnerable cities to the ongoing sea level rise include Jakarta, Mumbai, Tokyo, and Shanghai. In particular, Jakarta was mentioned as the “fastest-sinking city in the world” according to a 2018 BBC report<sup>13</sup>. The World Economic Forum predicted in 2019 that the city, currently home to over 10 million inhabitants, could be underwater by 2050, just 27 years from now. In Timbuloko, a coastal locality in Java that has been almost literally “swallowed by the sea,” they speak of a “slow disaster” because the sinking rate is up to 20 centimeters per year, double the rate recorded in 2010. The residents are already resigned<sup>14</sup>. The Indonesian government has begun to take drastic preventive measures and plans to move its capital city to Nusantara in the east of Borneo Island, about 700 kilometers from the current capital. The plan is to create a modern, “green,” and futuristic city, somewhat emulating what was done in Brasilia in 1960<sup>15</sup> or, for a more recent model, the South Korean city of Songdo.

To make matters worse, there are studies that set an earlier date, 2025 (though the error variability places it in 2050), for a phenomenon known as the collapse of the Gulf Stream and the Meridional Overturning Circulation (AMOC). This would have catastrophic effects globally<sup>16</sup>. While comments like these may seem apocalyptic and detached from reality, it is important to note that July 2023 was the hottest month on record since records have been kept<sup>17</sup>.

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<sup>13</sup> Mei Lin, Mayuri y Hidayat, Rafki (August 13<sup>th</sup>, 2018). Jakarta, the fastest-sinking city in the world. *BBC*. <https://www.bbc.com/news/world-asia-44636934>

<sup>14</sup> Channel New Asia (July 24<sup>th</sup>, 2023). Slow disaster: Indonesians in sinking village forced to adapt. *Channel New Asia*. <https://www.channelnewsasia.com/asia/indonesia-sinking-village-timbuloko-rising-tides-climate-change-3649801>

<sup>15</sup> McLaughlin, Katherine (May 18<sup>th</sup>, 2023). Indonesia Is Moving its Capital to a Futuristic, Green City - The plan is in response to Jakarta's overpopulation, pollution, and rising sea levels. *Architectural Digest*. <https://www.architecturaldigest.com/story/indonesia-is-moving-its-capital#:~:text=In%202019%2C%20knowing%20Jakarta%20was,to%20move%20the%20capital%20city>

<sup>16</sup> Carrington, Damian (July 25<sup>th</sup>, 2023). Gulf Stream could collapse as early as 2025, study suggests. *The Guardian*. <https://www.theguardian.com/environment/2023/jul/25/gulf-stream-could-collapse-as-early-as-2025-study-suggests>

<sup>17</sup> La Nación (August 8<sup>th</sup>, 2023). Julio pulverizó los récords: científicos confirmaron que fue el mes más caluroso de la historia a nivel global. *La Nación*. <https://www.lanacion.com.ar/sociedad/julio-pulverizo-los-records-cientificos-confirmaron-que-fue-el-mes-mas-caluroso-de-la-historia-a-nid08082023/>

So far, an analysis of two seemingly opposing phenomena emerges. On one hand, new inhabited structures arise, in some cases in places where there were only outcrops during low tide. On the other hand, places that have hosted or still host traditional populations and cultures cease to exist. However, the mentioned opposition arises from a common factor, which is human action. For the creation of new spaces, the effect is direct and short to medium-term. For the extinction of others, the pace is slower, governed by the influence of industrial gas emissions and global warming, but the effects expected in the medium term are already present in the most vulnerable places. What was thought of as a long-term phenomenon has accelerated its development, triggering the first alarms, responses, and questions.

Among the alarms, we can mention the recent statements of the Secretary-General of the United Nations (UN), Antonio Guterres, who warned with concepts such as “The era of global warming is over. The era of global boiling has arrived. The air is unbreathable, the heat is unbearable, and the level of benefits from fossil fuels and climate inaction is unacceptable<sup>18</sup>.”

Among the responses, some are noteworthy. The relocation of Indonesia's capital from Jakarta to Borneo seems to be a good alternative, although it is not clear what will happen to the inhabitants of the current capital, who may face a likely traumatic migration. The transfer of administrative and governmental institutions allows the continuity of state agencies' operations and can accommodate private entities, but it does not imply a complete “move.”

Tuvalu's solution is even more unique. The state will not have a physical place to relocate, so it will do so in the “cloud.”

Now, the questions. Will Tuvalu then be the world's first virtual state? The most significant aspect of Tuvalu's plan, and hence the mention of the case, is that the country intends (as mentioned earlier) to secure the status of a state and its maritime borders under international law in case its territory ceases to exist. Will other countries do the same when they lose portions of their territories due to the rise in sea levels? Will coastal baseline configurations and, consequently, adjacent maritime areas, territorial seas, contiguous zones, and exclusive economic zones need to be modified? Will international legislation change, for example, the United Nations Convention on the Law of the Sea, because of changes in the geography of the Indo-Pacific or other regions? In this regard, what we know so far is that artificial structures do not generate rights. How will the reverse phenomenon be addressed?

Continuing with Tuvalu, we have seen that its population is gradually migrating to Australia. Surely, their ties and alliances will deepen. Will there be other cases of

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<sup>18</sup> Euronews (July 27<sup>th</sup>, 2023). La era del calentamiento global ha terminado, empieza la era de la ebullición global, dice la ONU. *Euronews*. [https://es.euronews.com/green/2023/07/27/la-era-del-calentamiento-global-ha-terminado-empieza-la-era-de-la-ebullicion-global-dice-?insEmail=1&insNltCmpld=215&insNltSldt=10080&insPnName=euronewsfr&isIns=1&isInsNltCmp=1&utm\\_campaign=today\\_newsletter&utm\\_medium=referral&utm\\_source=newsletter](https://es.euronews.com/green/2023/07/27/la-era-del-calentamiento-global-ha-terminado-empieza-la-era-de-la-ebullicion-global-dice-?insEmail=1&insNltCmpld=215&insNltSldt=10080&insPnName=euronewsfr&isIns=1&isInsNltCmp=1&utm_campaign=today_newsletter&utm_medium=referral&utm_source=newsletter)

realignment of alliances because of climate or geographical changes? It is worth noting that in the Maldives, there may be Chinese investments in hospitality, ports, and infrastructure, and the resulting indebtedness could be addressed with a transfer of rights to China, similar to what Sri Lanka<sup>19</sup> did, an alliance that would reinforce China's "pearl necklace" strategy in the Indo-Pacific.

Will actors who fail to meet certain environmental care goals be penalized in any way? Will some nation-states whose territory is at risk of disappearing merge with others of greater expanse? A prime example could be Tuvalu with Australia or New Zealand. Going even further, will the list of UN members be modified? How will be mitigated the impact of traumatic forced migrations from densely populated, low-lying coastal areas? The UN Convention on the Status of Refugees mentions causes such as race, religion, nationality, membership in a particular social group, or political opinions. Will it be modified to include protection and assistance for refugees generated by climate change?

All the mentioned questions remain unanswered. What is clear is that they should be addressed urgently given the changing geography of the South China Sea and other places around the world, as a consequence of human activity. A possible initial, symbolic step may have been the meeting held between July 17<sup>th</sup> - 19<sup>th</sup>, 2023, by former U.S. Secretary of State John Kerry (currently serving as Special Presidential Envoy for Climate) with Chinese Vice Premier Han Zheng. John Kerry emphasized, in his official account on "X" (formerly Twitter), that the issue of global warming demands the two largest economies in the world to work together and take urgent actions to set limits. One of his posts (reproduced below) after the meetings highlights the urgent need for Sino-American cooperation to address the global threat of the climate crisis:



**Posts from Special Presidential Envoy John Kerry.  
Source: "X" (formerly "Twitter")**

<sup>19</sup> Observatorio de los Mares de China, "Situación Estratégica en el Pacífico Occidental y en el Índico – El "Collar de Perlas" en el Índico". *Escuela Superior de Guerra Conjunta*. [https://www.esgcffaa.edu.ar/maresdechina/situacion-estrategica\\_el-collar-de-perlas-en-el-indico.php](https://www.esgcffaa.edu.ar/maresdechina/situacion-estrategica_el-collar-de-perlas-en-el-indico.php)

Will we face a crisis that becomes an opportunity to establish aspects of cooperation between the two largest global competitors? Time will provide its answer, but Kerry's statements, who said, "Our hope is that this can be the beginning of a new definition of cooperation and the ability to resolve differences between us,"<sup>20</sup> could be indicative of a new stage. Meanwhile, the changing geography of the South and East China Seas and the Indo-Pacific will continue its dynamic of the emergence and disappearance of spaces occupied by humans.

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<sup>20</sup> The Korea Times (July 18<sup>th</sup>, 2023). Climate cooperation could redefine US-China ties: US climate envoy. *The Korea Times*, [https://www.koreatimes.co.kr/www/world/2023/07/501\\_355174.html](https://www.koreatimes.co.kr/www/world/2023/07/501_355174.html)