

Scientist explains how melting ice in Antarctica affects Indonesia

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Indonesia will face new challenges as current released IPCC reported states that oceans and cryosphere are melting in accelerated rate. Credit:

[NASA/Goddard/Maria-José Viñas, CC BY-NC](#)

Scientists, politicians and people of Iceland recently placed a plaque mourning [the loss of Okjokull glacier](#). Ok is no longer a living glacier because there has been insufficient ice build up over the years to expand its glacial mass. The plaque acknowledges what is happening and what needs to be done in the next 200 years as all Iceland's main glaciers are expected to suffer the same fate.

Indonesia has glaciers on the Jayawijaya Mountains in Papua. The ice-covered peaks have lost 84.9% of their glacial surface since 1988. A study has predicted the remaining glacial area will [disappear within ten years](#).

More alarming for Indonesia, [climate](#) change threatens not only its glaciers but also its vast seas, which make up around 70% of the country's area and are much deeper than the height of Jayawijaya Mountains.

A panel of [climate scientists](#) under the [Intergovernmental Panel on Climate Change](#), or IPCC, recently released the [Special Report on Ocean and Cryosphere in a Changing Climate](#) (SROCC). The report explains the latest understanding of our changing oceans and cryosphere (components of the Earth that are frozen).

I am involved in writing the IPCC's [Sixth Assessment Report](#) on ocean, cryosphere and [sea-level change](#). In this article, I explain SROCC findings that are relevant to Indonesia.

Oceans are getting warmer, more acidic, and losing oxygen

Some [104 climate scientists from 36 countries](#) assessed the state and projection of climate change impacts on oceans and cryosphere, and on ecosystems and humans, based on 6,891 [scientific publications](#).

Scientific findings have revealed the melting of the cryosphere that leads to global sea-level rise is just one of climate change's many domino effects.

The report underlines that climate change causes the oceans to become

warmer and more acidic and to lose oxygen persistently. Sea-level rise that may submerge small islands happens not only continuously but also is accelerating.

Extreme climate phenomena such as [marine heatwaves](#) are becoming more frequent and intense, and lasting longer, particularly in the tropics.

The same is true of extreme [El Niño–Southern Oscillation](#) events, which cause droughts and floods in Indonesia.

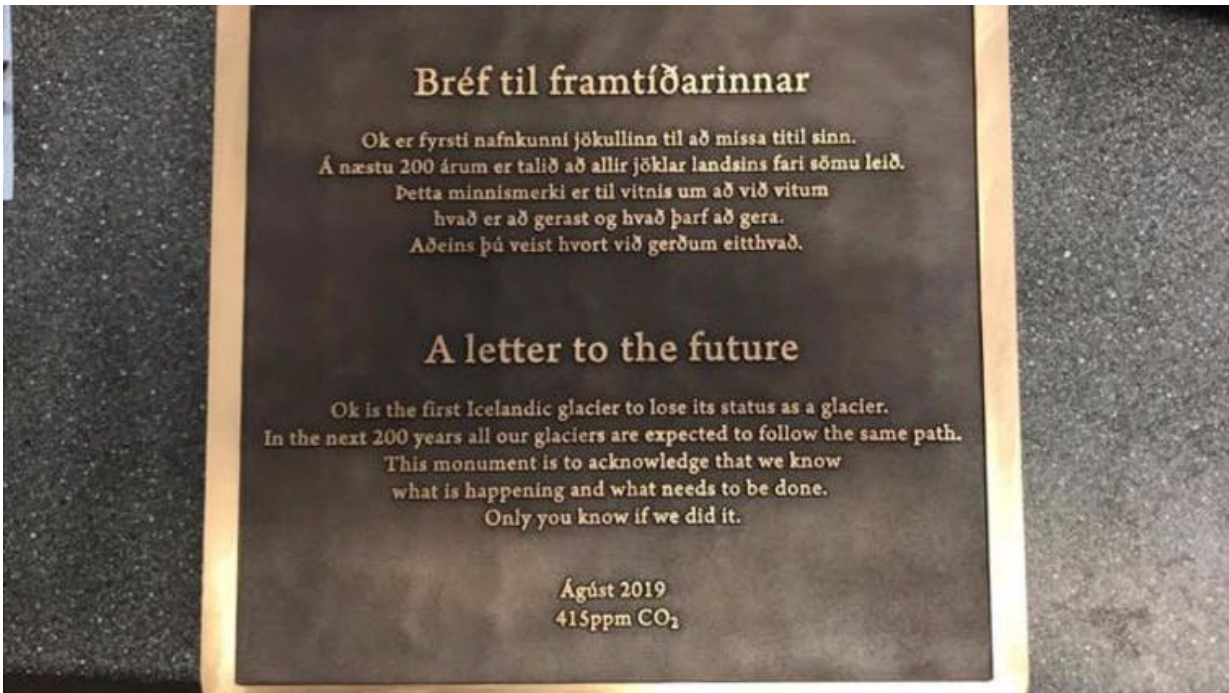
Shifted, pressured and reduced marine resources

SROCC has several important warnings about climate change impacts on Indonesia as a tropical archipelagic country.

First, marine biodiversity is at risk. Climate change causes shifts in seasonal rhythms and the geographical ranges of marine species.

Since the 1950s, marine species living in the upper 200 meters of the sea have been shifting poleward at about 52 kilometers per decade. A similar pattern is happening to [seafloor ecosystems](#). Considering the high biodiversity of marine species in Indonesia, further research is needed on changes in seasonal rhythms and geographical distributions of marine species in Indonesia.

Second, the report highlights coral reefs as the most sensitive key marine ecosystem compared to seagrass and mangrove ecosystems that are also prevalent in Indonesia.



Okjokull is the first Icelandic glacier lost to climate change. Credit: [Rice University](#), [CC BY-SA](#)

As host to [the largest seagrass ecosystems in Southeast Asia](#) and [23% of total mangrove forests in the world](#), this finding is important for Indonesia. Reduced ecosystem services of seagrass and mangrove may lower the capacity of coastal ecosystems to absorb carbon emission.

Third, ocean warming reduces Indonesia's maximum sea catch potential by up to 30% if greenhouse gas emissions keep rising throughout the 21st century. This adds to the burden on a fisheries sector already plagued by overfishing.

Combined effects of warmer and more acidic waters also have negative consequences for fish stocks and calcareous marine organisms (such as pearl oyster and lobster).

Don't blame everything on climate change

To formulate effective adaptation strategies, we need to understand the interactions of environmental degradation that occurs not only because of climate change.

A classic example is the problem of [rising sea level in Jakarta](#), as its impacts are primarily driven by land subsidence due to groundwater extraction.

The UN report also makes a distinction between ocean and coastal acidification. Ocean acidification refers to the increase of hydrogen ions in ocean waters due to reaction between CO₂ in the atmosphere and seawaters. However, Indonesian seas also experience coastal acidification due to local activities such as waste and pollution that further acidify seawater.

Local solutions that could regulate the ambient seawater acidity may reduce the impacts of ocean and coastal acidification on the local community. These include effective waste management and conservation of seagrass ecosystems.

SROCC and climate negotiation

SROCC is an important scientific input for climate negotiation under the UN Framework Convention on Climate Change Conference (COP25) in Spain this December, which will push for ocean themes or Blue COP.

As a maritime nation, Indonesia plays an important role in taking concrete and realistic actions on climate change.

SROCC shows the benefits of employing ambitious and effective

climate adaptation strategies, such as protecting coastal communities, particularly those with large populations, from rising sea level. This protection is in line with sustainable development.

SROCC states that the [ocean](#) is largely a victim of [climate change](#), while land is identified as the [primary culprit as well as victim of climate change](#).

Warmer, more acidic and deoxygenated oceans have implications for Indonesia's commitments to protect its biodiversity and achieve the [UN Sustainable Development Goals](#).

Climate change challenges our commitments to maintain marine biodiversity against mounting environmental pressures, coastal ecosystem services in mitigating greenhouse gas emissions or blue carbon, and sustainable use of marine resources.

Scientific findings in SROC and Blue COP as well as the [UN Decade of Ocean Science \(2021-2030\)](#) should create momentum to take actions that are inclusive and beyond business as usual. These efforts will be appreciated by future generations.

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