Australia's Barrier Reef at greater risk than thought, study says

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Fish swim through the coral on Australia's Great Barrier Reef, the world's largest coral bank

Australia's Great Barrier Reef (GBR), the world's largest coral bank, is at greater risk than previously thought of dissolving as climate change renders the oceans more acidic, researchers said Tuesday.

A decline in aragonite—the mineral that corals use to build their skeletons—is likely to accelerate, they found, as oceans absorb carbon

dioxide spewed by mankind's burning of fossil fuels.

This disturbs ocean chemistry, leading to a drop in the pH level and less aragonite, a crystal form of calcium carbonate.

Without this life-sustaining mineral, corals cannot rebuild their skeletons and will disintegrate over time.

For the study published in *Nature Communications*, scientists from Australia and Saudi Arabia created a new model for estimating the level of aragonite saturation—an indicator of future coral deposits—at more than 3,000 separate reefs within the larger GBR.

Physical measurement of aragonite at each individual reef on the 2,300-kilometre (1,400-mile) structure is an impossible feat.

The team used a model of ocean circulation and water chemistry, as well as data from direct observations.

They were able to pick up regional differences not observed in previous assessments.

Putting it all together, the team estimated that future decline in aragonite saturation "is likely to be steeper on the GBR than currently projected" by the UN's top climate science body, the IPCC.

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Too late?

This suggested that even if CO2 emissions are significantly reduced, as countries have pledged to do, it may be too late to prevent "potential losses in coral cover, ecosystem biodiversity and resilience."

The team found large variability between regions, and said the inner and southern reefs are at higher risk of damage.

"The model indicates that central reef waters may already be showing signs of dissolution," they wrote, adding "this region is likely to expand north and south with time."

The team said the data could be used to inform local coral management.

According to the IPCC, higher CO2 levels have caused the world's oceans to become about 26 percent more acidic since the onset of the Industrial Age, and may have already doomed coral reefs to extinction.

Green group WWF says nearly a third of the world's reefs have already been lost, and the rest could disappear by mid-century.

These unique ecosystems cover less than 0.1 percent of the ocean -– half the area of France –- but are home to about a quarter of marine species, including fish critical for human diets and livelihoods.

More information: *Nature Communications*, nature.com/articles/doi:10.1038/ncomms10732