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NTU study of ancient coral reefs in Indonesia revealed the slowest earthquake ever recorded

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By **NewsDesk**

IMAGE: The NTU Asian School of the Environment team that has studied ancient coral reefs in Indonesia (LR) includes: Associate Professor Emma Hill, PhD student Rishav Malik and Associate Professor Aaron ... view more

Credit: NTU Singapore

Researchers at Nanyang Technological University of Singapore (NTU Singapore) fou
32-year "slow" earthquake – the slowest ever recorded – ultimately led to the catast
Sumatra earthquake of 1861.

The NTU research team says their study highlights potential missing or misconfigur
in today's global earthquake risk assessments.

"Slow motion" or "slow slip events" refer to a type of prolonged, prolonged stress re
phenomenon in which the Earth's tectonic plates slide against each other without c
major vibration or damage to the Earth. It usually involves movements ranging from a few
centimeters / year to centimeters / day.

The NTU team made a surprising discovery while studying historical sea levels using ancient coral reefs called "microatolls" on Simeulue Island, located off the coast of Sumatra. Small coral particles grow sideways and higher, and are natural registers of changes in sea level and land elevation, through their visible growth patterns.

Using data from microatolls and combining them with simulations of Earth's tectonic plate movement, the NTU team found that from 1829 until the Sumatra earthquake in 1861, the southeastern island of Simolo was sinking into the sea faster than expected.

The NTU team said this slow slide event was a gradual process that eased pressure on the shallow portion of where two tectonic plates meet. However, this pressure was transferred to the nearby deeper part, culminating in the massive 8.5 magnitude earthquake and tsunami in 1861 which resulted in massive damage and loss of life.

The finding marks the longest slow-slide event ever recorded and will change world views of the timescale and mechanisms of the phenomenon, says the NTU team. Scientists previously believed that slow slide events only occur over hours or months, but NTU research shows that in reality they can last for decades without causing the catastrophic tremors and tsunamis seen in historical records.

The study's lead author, Rishav Malik, a PhD student at NTU Asian School of Ecology, said, "It is interesting how much we were able to discover from just a few perfectly positioned reef sites. The past The method we have adopted in this paper will also be useful for future studies of other subduction zones – places prone to earthquakes, tsunamis, and volcanic eruptions, so our study can contribute to better assessments of future risks. "

"When we first found these coral reefs more than a decade ago, we learned from their growth patterns that something strange was going on as they were growing," said Associate Professor Aaron Meltzner, co-author of the Earth Observatory in Singapore at NTU University. Now we're finally a viable explanation. .

The results, published in the peer-reviewed journal Nature Geoscience in May, led the authors to suggest that current earthquake risk assessments may ignore persistent slow slip events in the observations, and thus not properly consider the potential for slow slip events. Earthquakes and Tsunamis in the Future.

A possible 'slow-moving' earthquake is ongoing on Ingano Island

The shallow portion of the subduction zone lies further from the ground under kilometers of water, is usually "quieter" and does not produce many earthquakes. Its remote location also makes it difficult for land-based scientific tools to discover activities and for scientists to understand what is going on.

undamaged.

Although this may be true in some cases, the NTU study found that this slip is not as stable as assumed and can occur in slow slip events.

“Because these slow-slip events are so slow, we might miss them because the current automated recordings are generally only ten years old,” Reshaf said in detail in their ndings.

He added, “If a similar behavior is observed that leads to earthquakes elsewhere, this process may eventually be recognized as a precursor to an earthquake.”

Utilizing their research methodology, the NTU team also highlighted a potential ongoing slow-slide event on the island of Ingano, Indonesia, located about 100 kilometers (60 miles) southwest of Sumatra.

As Professor Meltzner said, “If our ndings are correct, then this means that communities living near this Indonesian island are likely to face higher risks from tsunamis and earthquakes than previously thought. This indicates that risk models and mitigation strategies need to be done. Update. ”