BIOENGINEER

NTU study of ancient corals Indonesia reveals slowest earthquake ever recorded

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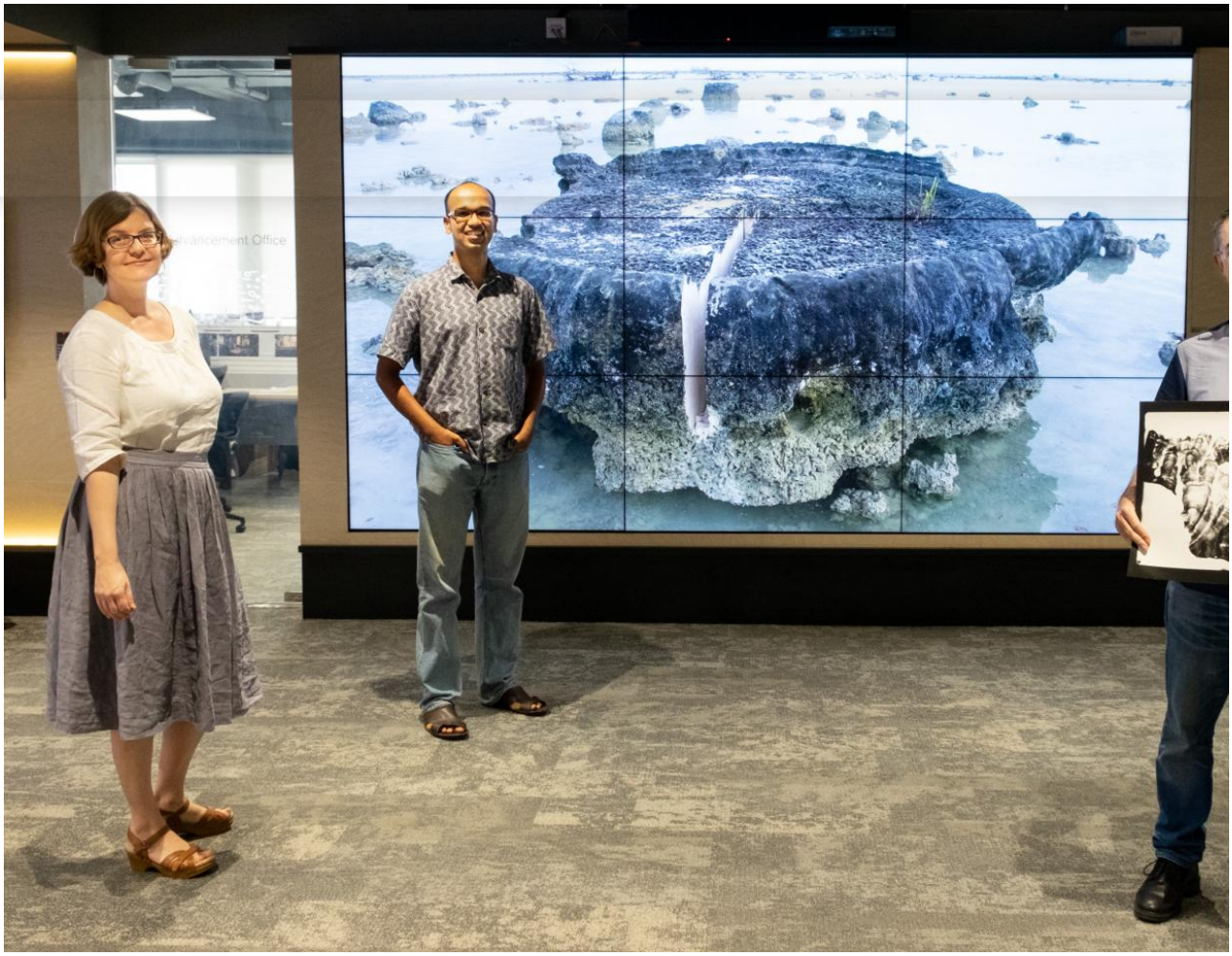

A ‘slow-motion’ earthquake lasting 32 years – the slowest ever recorded – eventua catastrophic 1861 Sumatra earthquake, researchers at the Nanyang Technologica Singapore (NTU Singapore) have found.

The NTU research team says their study highlights potential missing factors or mis global earthquake risk assessments today.

‘Slow motion’ earthquakes or ‘slow slip events’ refer to a type of long, drawn-out st phenomenon in which the Earth’s tectonic plates slide against one another without major ground shaking or destruction. They typically involve movements of betweer cm/year to cm/day.

The NTU team made the surprise discovery while studying historic sea-levels usin corals called ‘microatolls’ at Simeulue Island, located off the coast of Sumatra. Gro sideways and upwards, the disc-shaped coral microatolls are natural recorders of sea level and land elevation, through their visible growth patterns.

Using data from the microatolls and combining them with simulations of the motior Earth’s tectonic plates, the NTU team found that from 1829 until the Sumatra earth 1861, south-eastern Simeulue Island was sinking faster than expected into the sea

two tectonic plates met, said the NTU team. However, this stress was transferred t
neighbouring deeper segment, culminating in the massive 8.5 magnitude earthqua

tsunami in 1861 which led to enormous damage and loss of life.

The discovery marks the longest slow slip event ever recorded and will change glo
perspectives on the timespan and mechanisms of the phenomenon, says the NTU
Scientists previously believed that slow slip events take place only over hours or m
the NTU research shows that they could, in fact, go on for decades without trigger
disastrous shaking and tsunamis seen in historical records.

Lead author of the study, Rishav Mallick, a PhD student at the NTU Asian School o
Environment, said, “It is interesting just how much we were able to discover from ju
of ideally located coral sites. Thanks to the long timespans of the ancient corals, w
to probe and find answers to secrets of the past. The method that we adopted in th
also be useful for future studies of other subduction zones – places that are prone
earthquakes, tsunamis, and volcanic eruptions. Our study can therefore contribute
risk assessments in future.”

Co-author Assistant Professor Aron Meltzner from the Earth Observatory of Singap
said, “When we first found these corals more than a decade ago, we knew from th
patterns that something strange must have been going on while they grew. Now w
have a viable explanation.”

The findings, published in the peer-reviewed scientific journal *Nature Geoscience*
the authors to suggest that current earthquake risk assessments may be overlooki
slow slip events in the observations, and hence not properly considering the poten
slip events to trigger future earthquakes and tsunamis.

Possible ‘slow motion’ earthquake ongoing at Enggano Island

Located far from land below kilometres of water, the shallower part of the subducti
typically ‘quieter’ and does not produce as many earthquakes. Its distant location a
difficult for land-based scientific instruments to detect activities and for scientists to
what is going on.

Many scientists have therefore tended to interpret the ‘quietness’ of the shallow pa
subduction zone to mean that the tectonic plates lying underneath to be sliding alo
and harmlessly.

Elaborating on their findings, Rishav said, “Because such slow slip events are so s
might have been missing them as current instrumental records are generally only u
years long.”

He added, “If similar behaviour is observed leading up to earthquakes elsewhere,
might eventually be recognised as an earthquake precursor.”

Tapping on their methodology in the research, the NTU team also highlighted a po
ongoing drawn-out slow slip event at Enggano Island, Indonesia, located at about
miles) southwest of Sumatra.

Asst Prof Meltzner said, “If our findings are correct, this would mean that the comm
living nearby this Indonesian island are potentially facing higher risk of tsunami an
than what was previously thought. This suggests that models of risk and mitigation
need updating.”

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