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Why quake did not cause tsunami

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CHENNAI The powerful earthquake of 7.9 magnitude that struck off the coast of Indonesia had its epicentre about 100 km southwest of Bengkulu.

According to R.K. Chadha, scientist with the National Geophysical Research Institute, Hyderabad, the fault plane was in a northwest-southeast direction. The focus (where the plate rupture actually takes place inside the earth) was at a depth of about 30 km from the ocean floor.

"The length of the fault plane should not be more than 250 km. Its epicentre is 300-400 km further south of the December 2004 quake," Dr. Chadha said. The 2004 earthquake caused a rupture 1200 km long and pushed the Burma plate by 15 m for the entire length of the fault.

Shallow earthquake

In 2004, the focus was 10 km, and hence it was a shallow earthquake. Unlike deep quakes, shallow ones cause more damage. A tsunami that results from such quakes can be more powerful and widespread compared to deep-seated earthquakes.

The quake that struck at 6.10 p.m. local time on Wednesday had a magnitude of 7.9-8, while that of the 2004 quake was 9. With magnitude being measured on a logarithmic scale, a magnitude difference of one translates to a quake 10 times more powerful.

Though a tsunami can be generated even by a shallow quake of 6.5 magnitude, maximum tsunami energy will always be focussed in the

- The fault plane was in a northwest-southeast direction

- The focus of the quake was 30 km under the ocean floor

direction perpendicular to that of the fault plane. With the fault plane of Wednesday's quake lying in a northwest-southeast direction, the maximum energy dissipation would have been in the same direction.

Unlike in 2004, where the direction of energy dissipation from the fault plane was nearly parallel to the Indian coast, maximum energy dissipation from the current quake would not have been in the direction of the Indian coast but into the open ocean. On the northeast direction, the energy dissipation would have been towards Bengkulu island.

"Unloading of stress"

Following the 2004 quake, another earthquake of 8.7 magnitude struck off the coast of Sumatra on March 28, 2005, about 200 km south of the 2004 event. It happened in the same subduction zone. "We call this as loading and unloading of stress," said Dr. Chadha. "When stress is released at one point, it accumulates at another point. And, we had predicted that another quake would strike further south of the March event."

The latest quake was in the same subduction zone, and lies further south of March 2005 event.