

ASIAN TSUNAMI

NEW SUN DAY TIMES 30/05/2010
PAGE 34

By Chandra Devi Renganayar
chandra@nst.com.my

FOR many, it went from a perfect day in paradise to a horrific day in a matter of seconds.

The mega tsunami on Dec 26, 2004, left thousands dead and thousands more devastated.

From Sumatra to Sri Lanka, the huge waves which crashed inland, reduced cities and villages to rubble. The tsunami then continued on its devastating path, finally bringing chaos to the coast of Somalia in Africa, some 5,000km from its first landfall.

In total, more than 270,000 people were estimated to have been killed but the true death toll will never be known. The scale of the disaster shocked the world.



probably ruptured along an astonishing 400km of the fault. A long thin stretch of ocean floor had risen in a matter of seconds, lifting with it a column of water, displacing billions of tonnes of liquid.

While the experts are aware of what could have happened, they are perplexed how the tsunami could have hit Sri Lanka. For this to have taken place, the earthquake fault zone had to be way longer than calculated.

Using satellite images for the first time, the team systematically analysed images of islands along the mega thrust and calculated the amount of movement on the sea-bed.

The analysis revealed that the rupture was an incredible 1,600km, the biggest ever recorded and more than

such huge volumes of water could be travelling so fast, so far inland.

"I would have expected the waves to penetrate inland but I never expected these kinds of speed."

A video capture of the water arriving in the city centre then provided Synolakis with an answer. Focusing on the minor flooding that preceded the main torrent, he observed that the shallow layer of water was preparing the way for a deadly event.

"The first wave provided a low friction carpet for the following wave. The second wave moved on this very thin layer of the first wave so it is able to propagate much faster.

"Lubricated by the wet surface, the second wave was able to power

world.

What could have happened to bring this maelstrom? What kind of tsunami can create super high waves, retreating oceans, and devastating debris flow?

Most important of all, is there anything we can learn to prevent such a catastrophe from happening again?

A team of world class specialists came together to investigate and understand this catastrophe.

For Professor Costas Synolakis, head of the tsunami research centre in California; Kerry Sieh, a geologist; and George Plafker, a pioneer of tsunami science, there were some particularly troubling aspects of the disaster.

First was the unprecedented size and savagery of the waves. The second was the extraordinary range of the devastation.

“For a tsunami to cause chaos from Thailand to Africa, across 6,000km of ocean, about one-seventh of the earth’s circumference, the energy required is scarcely credible.

“What happened was beyond any scenario we had ever seen or imagined ever before,” said Synolakis.

Seismic data indicated a quake measuring 8.5 on the Richter scale, the biggest earthquake in more than a decade. The quake lasted an

unprecedented eight minutes and it was the biggest earthquake in 40 years.

The origin of the quake was 30km below the surface, 150km off Sumatra.

On the eastern boundary of the Indian Ocean lies a massive trench, formed at the edge of a vast fault line known as the Sunda mega thrust. Here, two of the world’s giant tectonic plates had collided. Seismologists calculated that the mega thrust

enough to account for the destruction witnessed as far away as Sri Lanka.

Next, the experts went on to find out why the wave was destructive so far inland in Banda Aceh. The waves had moved 2.5km inland.

Synolakis knew that it was the speed of the water that did the damage. As he surveyed the ravaged streets, he saw that sand and mud picked up offshore was deposited right across the city.

“The depth of this sediment is directly related to the water’s speed at that place. If the tsunami had come in very slowly, we would see more sediment close to shore. If it had come in very fast, we would see thicker sediment layers inland.”

The team carefully measured the layers of sediment deposited in key locations and their analysis revealed that the water flowed at up to 32km an hour, across most of the city.

Synolakis was at a loss to explain how

through the streets without slowing down.”

Just as Synolakis thought he had solved the mystery, he heard about large waves just 13km to the south in Lhokgna. The run-up measured was huge, in excess of 30 metres, three times more than the maximum water depth in Banda Aceh.

Plafker was called in to investigate.

“Based on all my experience, the wave for an earthquake of that magnitude should have been about 12 metres high but certainly not anything near 30 metres,” said Plafker.

He discovered that the monstrous waves that arrived on the west coast of Sumatra were too early to have come from the source of the main tsunami.

A detailed geological map of the sea floor provided Plafker with an answer. Splay faults often found near large earthquake zones can cause a long, narrow section of the sea floor to ‘pop up’ in a matter of seconds, and this can produce a distinctive, short burst of high waves, just like those that flattened Lhokgna.

Watch the experts as they investigate the chain of events that triggered this disastrous event on the National Geographic Channel’s (Astro Channel 553) *Asian Tsunami*. The programme will premiere on May 31 at 11.30pm.

