

# TSUNAMI!

## 0. The Impossible - Story Preface

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A tsunami warning sign urges people to find higher ground when a tsunami threatens. Image online, courtesy NOAA (National Oceanic and Atmospheric Administration).

*This is one of the gifts the wave gave me.  
I don't care about myself anymore.*

Dr. Maria Belón

Christmas, 2004, would be fantastic. Enrique Alvarez and Maria Belón had a great plan to make that happen. They, and their three boys, would travel to a Thai resort on the Indian Ocean. Beautiful days, and swimming in warm water, would only be part of the fun.

But ... while the Alvarez-Belón family enjoyed Christmas together, two tectonic plates—which had been rubbing against each other for years below the ocean floor—were stuck. Their edges were locked together, causing so much stress and pressure that the upper plate began to resemble a tightly wound, gigantic spring.

When the ever-increasing pressure reached its breaking point, the two tectonic plates could no longer stay locked. On "Boxing Day"—the day after Christmas, 2004 (when many people "box up" and store their holiday decorations for another year)—the fault started to rupture, thrusting upwards at least 40 feet.

At twice the speed of a traveling bullet, the plates "unzipped" for a distance greater than 750 miles.

This "mega-thrust" event didn't just lift the ocean floor, it also displaced the ocean above. Huge amounts of seawater, forced upward by the movement of the sea bed, flowed away from the fault.

On the surface, displaced water began to fan out as a series of giant ripples. A tsunami was born, and it began traveling around 500 miles an hour.

What started as a series of ripples became a series of waves moving ever nearer to the Indian-Ocean shoreline of many countries. The closer the waves got to land, the more threatening-to-humans they became.

No victim had any warning of a catastrophe-in-the-making. A doctor in Spain, Maria Belón became a patient in Thailand after the "Boxing-Day Tsunami" roared ashore at Phuket.

See Alignments to State and Common Core standards for this story online at:  
<http://www.awesomestories.com/asset/AcademicAlignment/The-Impossible>

See Learning Tasks for this story online at:  
<http://www.awesomestories.com/asset/AcademicActivities/The-Impossible>

## Questions 2 Ponder

### What Happens When Tectonic Plates Suddenly Unzip?

On the 26th of December, 2004, two tectonic plates, which had been rubbing against each other for years below the ocean floor, were stuck. With their edges locked together, so much pressure was being generated

that the upper plate started to resemble a tightly wound really gigantic spring.

When the increasing pressure reached its breaking point, the two tectonic plates could not stay locked. The fault started to rupture, thrusting upwards at least forty feet.

At twice the speed of a traveling bullet, the tectonic plates suddenly “unzipped” for a distance of more than 750 miles. Click-on the image, above, to activate a simulated animation.

When this mega-thrust event occurred, it didn’t just lift the ocean floor. It also displaced the ocean above. That displaced water started to travel away from the fault.

A tsunami was thereby born, and it started to move at about 500 miles per hour.

What is the scientific explanation for the mega-thrust event which occurred below the Indian Ocean on December 26, 2004?

Is there a way for scientists to know when a mega-thrust event is about to happen? Explain your answer.

Is there a way for scientists to know when a tsunami is about to happen? Explain your answer.

### **How Could a Massive Tsunami Strike without Warning?**

On the 26th of December, 2004, a massive tsunami struck coastal areas of the Indian Ocean. No one knew the tsunami was racing toward land, traveling around 500 miles per hour.

Although other coastal areas, like the Pacific Rim, had tsunami-warning systems in place on that day, the Indian Ocean did not.

Why do you think there was no tsunami-warning system to in place to alert people living in the Indian-Ocean area of a potential catastrophe?

Is there any reason, you can think of, to explain how it could be that people in the 21st Century were unprotected by something as important as a tsunami-warning system?

### **Are We All the Same When a Tsunami Strikes?**

After the massive tsunami waves caused a catastrophe in so many areas along the Indian Ocean, Dr. Maria Belón made this observation:

*We were the same. We had no race, no language, no nationality, no social standard. We were just the same.*

What do you think Dr. Belón meant when she said the tsunami’s victims “were just the same?”

## Media Stream



### Tsunami Warning Sign

NOAA—the U.S. National Oceanic and Atmospheric Administration—issues cautions which coincide with a tsunami warning sign like this one.

#### **Warning signs of a tsunami:**

- **A strong earthquake**
- **A sudden rise or fall of the ocean tide**
- **A loud, roaring sound (like an airplane or a train) coming from the ocean**
- **Tsunami warnings broadcast over television and radio, by beach lifeguards, community sirens, text message alerts, NOAA tsunami warning center Web sites and on NOAA Weather Radio All Hazards**

#### **What you should do if you see these signs:**

- **Don't panic**
- **Move inland to higher ground, or into a tall building immediately and stay there**
- **Turn on your radio or television to learn if there is a tsunami warning**
- **Stay away from the beach until officials issue an "all clear"**

However ... for most people impacted by the massive tsunami which struck on 26 December 2004, there were no warnings at all.

Tsunami warning sign and warning cautions, [online courtesy NOAA](#).

View this asset at: <http://www.awesomestories.com/asset/view/Tsunami-Warning-Sign>



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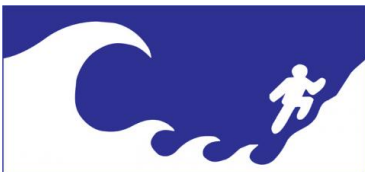
### Maria Belon - Maria Bennett - "The Impossible"

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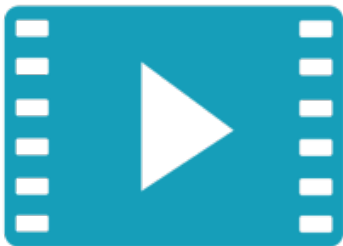
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**TSUNAMI!**

### The Impossible

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### Tsunami Waves - The Basics

Video clip, by NOAA PMEL, online courtesy NOAA PMEL's Channel at YouTube.

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