**Natural Disasters: Tsunamis**

**A person riding a wave on a surfboard in the water

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**Introduction**

Tsunamis are one of the most dangerous natural forces of the ocean. The word tsunami comes from two Japanese words: tsu meaning harbor and nami meaning wave. (6) They can be described as “giant waves” they can be caused by earthquakes and volcanic eruptions that may occur under the sea. In the depths of the ocean, tsunami waves are not that high, but as the waves travel and the water gets shallower, they build up to higher heights. (1) Tsunamis can cause damage to some of the things man takes most pride in, thus showing the power and risk of tsunamis. This research report will discuss the causes and effects of tsunamis, as well as what the future of tsunamis looks like due to changing weather conditions.

Water next to the ocean

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1

**Chapter 1: Tsunamis Explained**

Causes:

A lot of people assume that tsunamis are just giant waves caused by the moon just like tidal waves. However, it is important to note that tsunamis are not tidal waves as they do not have anything to do with the moon. In fact, tsunamis are actually caused by an underwater megathrust. (1)

Earthquakes, volcanic eruptions, submarine landslides, and coastal rock falls are also possible causes for a tsunami. And in theory, an Extraterrestrial Collision could also cause a tsunami, however, there is no such event recorded in history to date. Vertical movements of the sea floor with the following displacement of a water mass can be considered as the origins of a tsunami. (2)

A picture containing text

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The picture above shows how an earthquake can cause a tsunami.

2

Where do Tsunamis Occur:

An important thing to note when talking about the dangers of a tsunami is that not all coastal areas are in danger of a tsunami. As mentioned in the previous sub-chapter, tsunamis occur as a result of a megathrust like earthquakes and volcanic eruptions. Thus, areas prone to earthquakes, volcanic eruptions, and landslides are at a higher risk of tsunamis.

Places like Japan and the Philippines are coastal regions prone to tsunamis. This is because they are prone to megathrusts, and not to mention they have the Pacific Ocean joining in from every shoreline. In the Pacific Ocean subduction zones are very common thus increasing the risk of tsunamis. In fact, scientists estimate that three-quarters of all the tsunamis recorded in history took place in the Pacific Ocean. (3)

A close up of a map

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The picture above shows an example of subduction zones

(in red color) in the Pacific Ocean.

3

**Chapter 2: Effects of Tsunamis**

Effects on Land:

The effect of a tsunami on land ranges from property damage to death and even diseases. First of all, death, because of the force at which a tsunami hits the shore it can cause many people to die and leave many more injured. For example, a tsunami in Sri Lanka killed 31,000 people and left 23,000 people injured. (4) Tsunamis can also cause severe property damage, they can break buildings, bridges, destroy roads, homes and much more. It is estimated, that a tsunami that hit the coast of japan in 2011, caused $309 billion in property damage. (5)

Tsunamis can also cause diseases because sea water could flood rivers and pure water reserves causing drinking water to be contaminated. Tsunamis can also cause illnesses such as malaria to arise when water is still and contaminated. (4)

A large white building

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The picture above shows the damage caused by a tsunami in Japan.

4

Effects in the Ocean:

The damage a tsunami can cause in the ocean can completely reprogram the entire ecosystem of the ocean. For example, when Japan was hit by a tsunami in March 2011, it caused a cooling system failure at the  [Fukushima Daiichi Nuclear Power Plant](https://www.livescience.com/13294-timeline-events-japan-fukushima-nuclear-reactors.html), resulting in a “level-7”nuclear meltdown. This caused many radioactive materials to make their way into the ocean, such as cesium-134 and cesium-137 which are also called “radioactive isotopes”. (7)

Tsunamis can also destroy coral reefs and force out native species. A tsunami can destroy pretty much anything that comes in its path; this includes marine structures like coral reefs. When tsunamis bring debris into the ocean, algae and other organisms can attach to the debris and overtime cause native species populations to decline as their population flourishes. (8) And not to mention, debris brought into the ocean by a tsunami is bad for the ecosystem on its own as it pollutes the ocean.

A pile of dirt

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This picture shows floating tsunami debris in the Pacific Ocean.

5

**Chapter 3: Rising sea levels & Tsunamis**

Do rising sea levels increase the risk of tsunamis:

Although Tsunamis are caused by megathrusts, rising sea levels could increase the chances of tsunamis dramatically. Rising sea levels would cause earthquakes with low magnitudes to trigger tsunamis. This would increase the frequency of tsunamis as well as cause tsunamis in “tsunami safe areas”. (10)

A study conducted at **Nanyang Technological University, Singapore showed that a rise in sea level of just 0.5 meters could increase tsunami induced flooding by 2.4 times. What this means is that rising sea levels would cause tsunamis to flood and move more inland. This would cause places not prone to tsunami induced flooding to be affected.**

**This means that rising sea levels would increase tsunami induced flooding as well as the frequency of tsunamis.**

A close up of a map

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The picture above compares current tsunami induced flooding

to what flooding is expected to look like in the future.

6

How can you protect yourself from tsunamis:

At this point I think it is established that tsunamis are extremely dangerous, but the question remains is there any way to protect yourself in case of a tsunami. There is no way one can guarantee safety but if you do find yourself in a tsunami there are some things you can do that might just save your life.

First of all, try to move inland and stay on higher ground. Moving as far from the coast as you can possibly go could stop the flooding from reaching you and staying on a high place could stop the tsunami wave itself from reaching you. However, if you are in a boat move towards the sea because if you start coming towards the shore you might get caught in the tsunami. (11)

A screenshot of a cell phone

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**Conclusion**

In conclusion, tsunamis are one of the most dangerous natural forces on the planet. A tsunami will not show mercy to anything in its path. And as with most natural forces there is no way one can guarantee safety or prevent a tsunami. However, not all of us living in coastal areas need to worry about being caught in a tsunami.

A picture containing outdoor, water, surfing, nature

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