

## **Using Earth Science to Predict Tsunamis and Save Lives**

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This project is about how tsunami warning systems can be used in Tsunami prone regions. Tsunamis are devastating natural forces that are dominant especially in Southeast Asia but all over the world, where there are a lot of developing countries that cannot recover quickly when a disaster strikes. With tsunamis come a lot of loss of life because tsunamis can be deadly. One of the best ways to prepare for a tsunami is to know in advance that a tsunami is coming. If you know that a tsunami is coming, you have time to leave the coastal area. The tsunami warning system should be able to meet multiple criteria, including, but not limited to, keeping costs low, maximizing warning time, and minimizing false alarms to avoid loss of public trust in the system. The problem that I wanted to solve was designing better and more cost efficient tsunami warning systems - both in places that already have them and in places that do not currently have systems. When designing warning systems, I have an array of steps that I have to follow. First looking at maps of tectonic plates, then looking at previous sensor data, simulating where tsunamis could come, then actually placing the sensors. To help me with designing these complex systems, I have been combing through publicly available seismometer data and have asked for access to DART (NOAA's tsunami warning system) data. Locating the sensors is a very complex task because you have to look at a lot of things before you finally decide. The impact of this project is huge - tsunami warning systems save lives. Not just a few, but hundreds of thousands of them. In the Indian Ocean tsunami of 2004, more than a quarter of a million people died. That is only bound to get worse as sea levels rise and people leave their rural inland farms to go make a living at the coastal cities. Hundreds of millions of people in the United States, and billions of people in the world live in cities, and that number is only going to grow due to urbanization. According to the United Nations, three million people move to urban areas every week, and the percentage of city dwellers in the world is 54%, compared to 30% in 1950. With all of the factors of global warming making natural disasters more often and powerful, rising oceans bringing the tidal wave of a tsunami ready to wipe out a city, urbanization bringing many people in the line of danger, the threat of a tsunami is ever most imminent in our society today which is why it is very important to have an effective tsunami warning system.