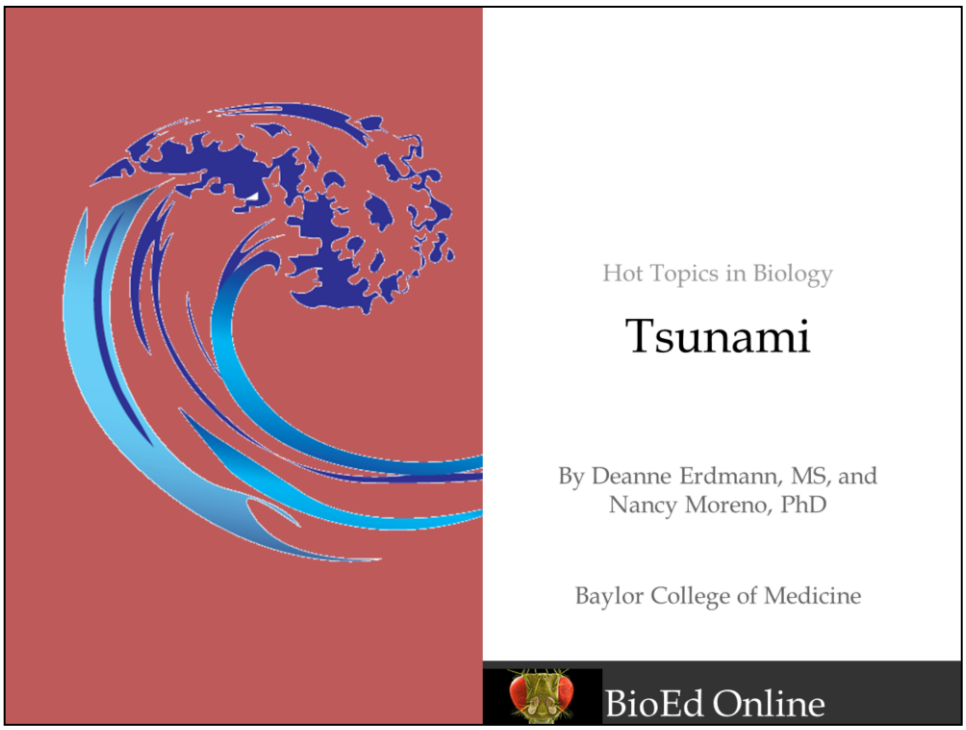
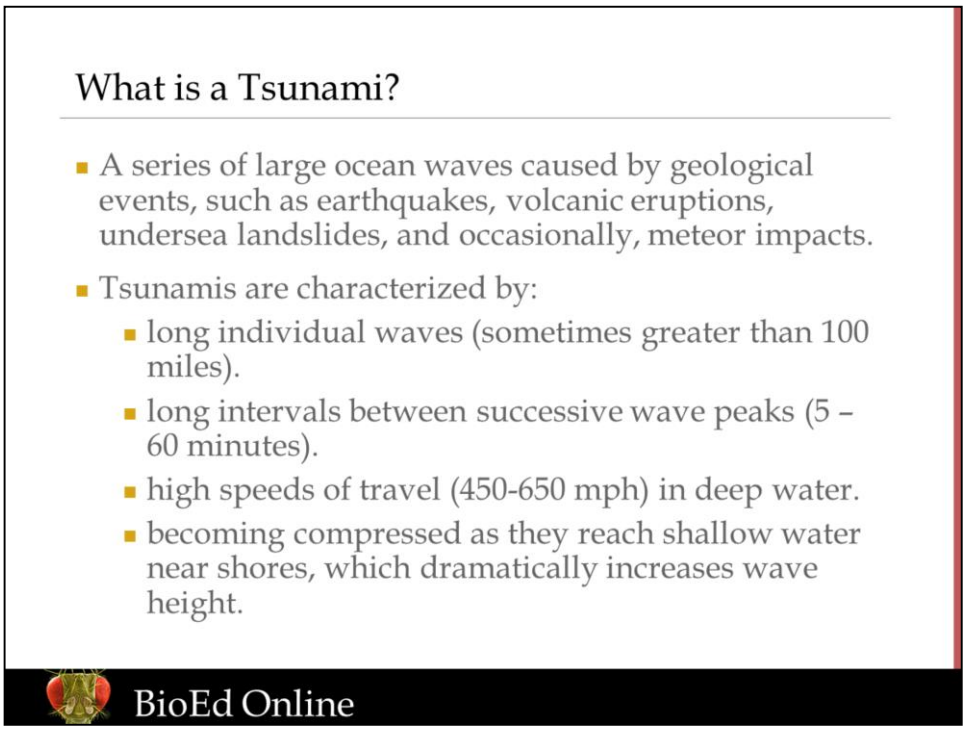


Image Reference:

NOAA. (2004). *Big wave.* Retrieved 03-01-2005 from http://www.prh.noaa.gov/pr/itic/library/pubs/great_waves/images/?M=D.

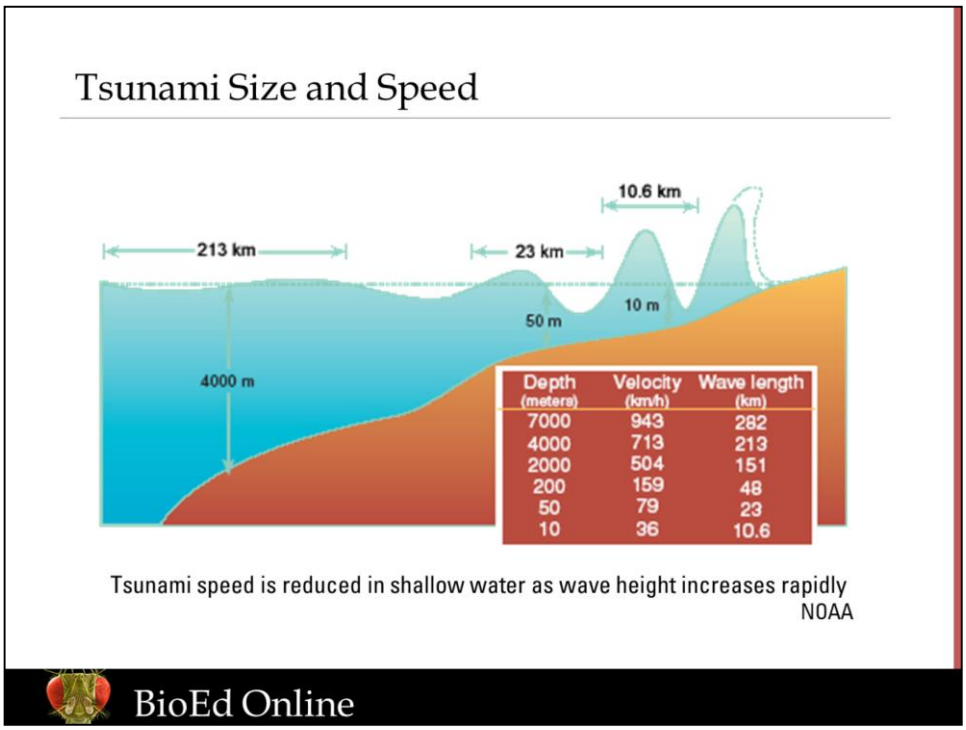


What is a Tsunami?

A tsunami is a series of large ocean waves, generally caused by geological disturbances that displace a large volume of water. Radiating like ripples on a pond, tsunami waves can move at incredible speeds for long periods of time. Surprisingly, they can go virtually unnoticed in the open ocean because they may reach a height of only 12 inches or so. As the waves approach shallower water near a shore, they slow and compress, and increase significantly in height.

Reference:

NOAA. (2004). *NOAA backgrounder*. Retrieved 2-03-2005 from http://www.prh.noaa.gov/itic/tsunami_events/media/factsheets/backgrounder.pdf.



Tsunami Size and Speed

Normal, wind-generated deep ocean waves and tsunami waves differ in the length and in the amount of time that passes between successive peaks (tsunami waves can be as far as one hour apart). Regardless of type, a wave will lose energy at a rate inversely proportional to the wave's length. Because tsunami waves can exceed 100 miles in length, they can travel for long distances with very little energy loss. Thus, they still retain most of their energy when they reach land. Tsunami speed is related to the depth of water. In deep ocean waters, tsunami wave velocities can reach 600 mph. The speed decreases as the waves approach the shore; however, the waves compress and increase dramatically in amplitude as they enter more shallow water. Waves that would be barely noticeable in the open ocean may reach heights of 100 feet near landfall.

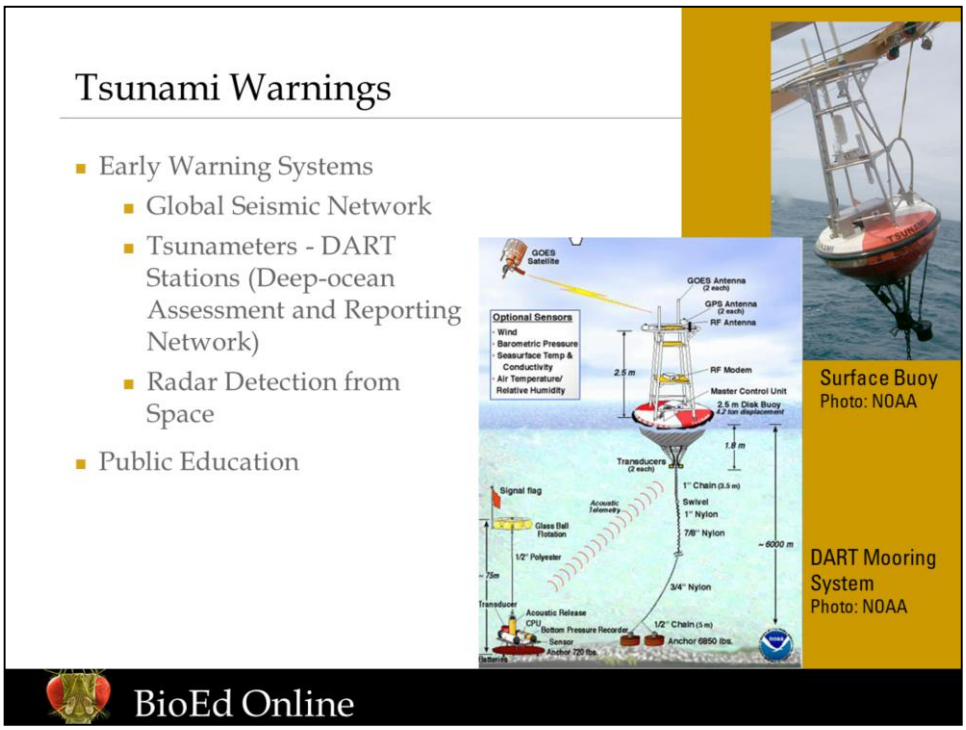
Reference:

NASA. (1995). *Tsunami – the big wave.* Retrieved 02-04-2005 from http://observe.arc.nasa.gov/nasa/exhibits/tsunami/tsun_bay.html

Image References:

NOAA. (2004). *Tsunami the great waves.* Retrieved 03-01-2005 from

http://www.prh.noaa.gov/pr/itic/library/pubs/great_waves/tsunami_great_waves.html



Tsunami Warnings

When discussing early warning systems, it is important to remember that geological events can trigger tsunamis so close to shore that the waves arrive onshore only minutes later. In such cases, no warning system would be effective. However, tsunami warning systems could be highly beneficial in instances where there are hours before the potential waves make landfall.

Seismographs detect earth movements from sudden displacements in the ocean floor or volcanic activity. They provide a first line of defense, alerting monitoring stations of seismic events large enough to generate a tsunami. Unfortunately, these alerts can raise false alarms, which may do more harm than good. Not only are evacuations costly, but after a series of false alarms, the public tends to ignore warnings.

Tsunameters were developed by Project DART at NOAA's Pacific Marine Environment Laboratory. They acquire critical data for real-time forecasting via six systems that have been deployed to oceanic regions with a history of generating tsunamis that could threaten U.S. coastal communities.

For the first time, during the December, 2004 Indian Ocean tsunami, radar satellites detected and recorded the height of tsunami waves. This is an important technology that may be incorporated to improve early warning systems.

In addition to early warning systems and technology, public information must be available in all areas at risk of tsunamis. Useful information might include: which local areas are in the danger zone; the height of public and private buildings and dwellings; and how to make evacuation plans with family members, including the supplies to have on hand, and where to obtain assistance after the event. Also, it is important for the public to be aware that the behavior and duration of tsunami waves can vary greatly from one event to the next. Thus, it is critical to heed instructions from local officials.

References:

FEMA. (2004.) *Fact sheet: Tsunamis*. Retrieved 02-28-2005 from http://www.fema.gov/hazards/tsunamis/tsunamif.shtm.

Incorporated Research Institutions for Seismology. (2003.) *Global seismographic network.* Retrieved 02-28-2005 from http://www.iris.edu/about/GSN/.

NOAA. (2004.) *Deep-ocean assessment and reporting of tsunamis*. Retrieved 02-28-2005 from http://www.pmel.noaa.gov/tsunami/Dart/.

NOAA. (2005.) NOAA scientists able to measure tsunami height from space. Retrieved 03-01-2005 from http://www.noaanews.noaa.gov/stories2005/s2365.htm.

NOAA. (2005.) *Tsunamis*. Retrieved 02-28-2005 from http://www.noaa.gov/.

Image References:

NOAA. (2004.) Deep-ocean assessment and reporting of tsunamis. Retrieved 02-28-2005 from http://www.pmel.noaa.gov/tsunami/Dart/.