What causes a tsunami?

A tsunami can be generated by any disturbance that displaces a large mass of water, such as an earthquake, landslide or meteor impact.

Tsunamis can be generated when the sea floor abruptly deforms and vertically displaces the overlying water. Tectonic earthquakes are a particular kind of earthquake that are associated with the earth's crust deformation; when these earthquakes occur beneath the sea, the water above the deformed area is displaced from its equilibrium position. Waves are formed as the displaced water mass moves under the influence of gravity to regain its equilibrium. When large areas of the sea floor elevate or subside, a tsunami can be created. Large vertical movements of the earth's crust can occur at plate boundaries. Plates interact along these boundaries called "faults". Around the margins of the Pacific Ocean, for example, denser oceanic plates slip under continental plates in a process known as subduction. Subduction earthquakes are particularly effective in generating tsunamis.

Submarine landslides, which often accompany large earthquakes, as well as collapses of volcanic edifices, can also disturb the overlying water column as sediment and rock slump downslope and are redistributed across the sea floor. Similarly, a violent submarine volcanic eruption can uplift a water column and generate a tsunami.

Large landslides and cosmic-body impacts can disturb the water from above, as momentum from falling debris is transferred to the water into which the debris falls. Generally speaking, tsunamis generated from these mechanisms, unlike the Pacific-wide tsunamis caused by some earthquakes, dissipate quickly and rarely affect coastlines distant from the source area. However if the landslide or cosmic body is large enough, it will create a megatsunami. A megatsunami is a tsunami, usually caused by a collapsing island, asteroid impact, or huge chunks of ice falling into a large body of water, and is hundreds of meters high.