Physical Modeling of Tsunami Generation, Propagation and its disastrous effect

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A tectonic earthquake when they occur beneath the sea, the water above the deformed area is displaced from its equilibrium position. Waves are formed as the displaced water mass, acting under the force of gravity, tries to regain equilibrium. When large areas of the sea floor elevate or subside, a tsunami can be created. The waves sweep across the open ocean at high speed and have caused severe damage to costal areas thousand of miles from the earthquake which generated them. An eye-witnesses of December 26, 2004 accounts in understanding tsunami effects. To understand the mechanism of tsunami propagation and the selection of certain section of coastline for waves of destructive amplitudes it is necessary to recognize the depth dependence of wave velocity which is the feature of shallow water wave. The velocity of this class of wave may be derived by assuming equipartition of the potential and kinetic energies of the wave motion. In the present article quantitative derivation of tsunami speed and its disastrous effect has been discussed. The tsunami's energy flux, being dependent on both its wave speed and wave height, remains nearly constant. As a result, the tsunami's speed decreases as it travels into shallower water and its height increases. In deep ocean it appears as low rise tidal waves But, when it reaches the coast, it may appear as a rapidly rising or a series of breaking waves. Being human inability to predict earthquakes and since earthquake magnitude does not determine tsunami impact,resulting tsunamis can be detected by seabed monitors and ocean buoys leaving adequate time for evacuation and information dissemination technologies though, is a minor part of the solution and a mechanism needs to be in place to interpret alerts, relay the warning to local communities through awareness and enable them to undertake quick action.