# ANALYTICAL MODELING OF TSUNAMI GENERATION PHASE IN 2010 CHILE EARTHQUAKE

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**Abstract:** An earthquake with a magnitude of 8.8 on the moment magnitude scale struck the coastal region of Maule in southwestern Santiago, the capital of Chile, On February 27$^{th}$, 2010. Since the Depth of the Earthquake has been located at a distance of 35 kilometers of the mean sea-level in Pacific Ocean, the analytical modeling of Seafloor deformation for modeling tsunami generation phase and the way of Floor deformation is of considerable importance. Tsunami waves at the moment of creation in the ocean till their depreciation in coastal regions pass three phases included; generation phase, Propagation phase, and Run-up phase. Tsunami generation phase is created due to the deformation of the sea floor as a result of earthquake. In other words, the model and amount of the deformation of the sea floor after an earthquake can be considered as good criteria for the assessment of the danger of tsunami. For this aim, according to earthquake magnitude, factors like; average slip amount *D*, width *W*, and fault length *L*, by the use of Empirical Relationships among earthquake parameters were determined and by using the analytical models of Deformation of Earth's crust as a result of tectonic movements and specially Okada Model, displacement field was calculated. Analytical modeling gives the researchers a good view of the way of deformations caused by different kinds of faults. So the way of Deformation of Earth's crust resulting from earthquake, before its occurrence and according to the kind of fault in that region, will be predictable. The results of modeling show that the maximum value of displacement along X and Y axes are 0.96 m and 1.6 m respectively and along Z axis, that plays a very important role in raising the sea level, is 4.04 m.

Keyword: Fault, Tsunami, Okada Model, Analytical Modeling, Displacement Field