

Numerical Modeling of Tsunamis and Storm Surge

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Abstract: Many geophysical flows over topography can be modeled by two-dimensional depth-averaged fluid dynamics equations. The shallow water equations are the simplest example of this type, though it is often necessary to incorporate more complex rheologies or to use multi-layer models. These equations are generally hyperbolic and can be modeled using high-resolution finite volume methods designed for such problems. The GeoClaw software (www.clawpack.org/geoclaw) has been developed to solve such problems using adaptive mesh refinement and other special techniques required for geophysical flows over topography. These methods will be described in the context of tsunami modeling (where shallow water equations are a good approximation) and storm surge modeling using 2-layer shallow water equations.

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