1046-65-877 **David L George*** (dgeorge@amath.washington.edu), U.S. Geological Survey, Cascades Volcano Observatory, 1300 SE Cardinal Court, Building 10, Suite 10, Vancouver, WA 98683. *Numerical methods and software for hazardous free-surface geophysical flows.*

A large class of hazardous geophysical flows involves a shallow free-surface mass flowing under the influence of gravity. Examples of such flows include river flooding, storm-surges, tsunamis, landslides, avalanches and similar debris flows. Often the movement and inundation of these flows onto "dry" land is the relavent physical feature of interest from a hazard modeling perspective. We model these types of flows with 2D depth-averaged equations, which makes large-scale computations tractable (such as modeling an entire ocean in the case of tsunami modeling.) All of these flows present similar difficulties from a numerical or computational perspective. First, they exhibit diverse spatial scales—meter or centimeter scale grids are often needed at the inundating front on a domain that might extend thousands of kilometers. Second, the boundaries of the flowing mass moves throughout the domain. Third, often dynamic features of the flow are due to a deviation of balanced steady-states that present well-known numerical difficulties. Lastly, these systems exhibit discontinuities and nonunique solutions indicative of hyperbolic systems. I will describe the numerical methods and software that we develop for these applications. (Received September 12, 2008)