The first generation of tsunami inundation maps for the State of California

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Abstract. Cascadia subduction zone tsunamis could conceivably cause the loss of tens of thousands of lives on the Pacific Northwest coast of North America. Paleoseismic and other data support Cascadia earthquakes with moment magnitudes of ∼9, rupture lengths of ∼1000 km, and recurrence of ∼500 years; the last event was 300 years ago, so the conditional probability of another is quite significant. Hydrodynamic simulations depicting destructive potential of Cascadia tsunamis have been hindered chiefly by uncertainties in the earthquake source, rupture simulation methods, and lack of independent verification. Uncertainties in the hydrodynamic simulation methods and oceanographic factors are also of concern, but coseismic seafloor deformation is a much greater source of error. Priority should be given to research on refinement of our knowledge of asperities, splay faults, total fault slip, and rupture simulation algorithms. Tsunami and fault dislocation simulations should be checked against coseismic deformation, inundation, water depth, and current velocities estimated independently from investigations of paleotsunami deposits and buried salt marsh soils. An organized interdisciplinary team effort operating within the framework of a comprehensive science plan is clearly needed. Leadership at the federal level in both Canada and the United States is the key to further progress.

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