Geophysical Research Abstracts
Vol. 19, EGU2017-3654, 2017
EGU General Assembly 2017

Incorporating short bottom length scale perturbations for tsunami source treatment in long wave models

Finn Løvholt (1) and Geir Pedersen (2)

(1) NGI, Computational Geomechanics, Oslo, Norway (finn.lovholt@ngi.no), (2) University of Oslo, Department of Mathematics, Oslo, Norway (geirkp@math.uio.no)

Tsunami generation by complex sources such as earthquakes with non-uniform slip and possible splay faults, slumps and submarine landslides often involve small lateral extents. However, it may be unclear how to treat the source terms originating from short scales, or to quantify which extent the short scales influence the wave generation. Due to the large geographical scale of the tsunami phenomenon, it is still necessary to resort to the application of long wave models for the propagation and run-up parts. A crucial question is then how well complex sources may be described by simplified source models, which may be incorporated directly in a long wave framework. A related question is what requirements the long wave model must meet to facilitate such an approach. We address this issue through analysis of both earthquake and slide cases, including experiments. It turns out that waves generated from bottom sources (slides, earthquakes, but not, for instance, asteroid impacts) are near or within the realm of dispersive long wave equations, but that the source itself often must be approximately treated with a more general theory, even though a full simulation with primitive equations may not be needed.