



A new model of gravity driven flows over general topography with erosion

Y.C. Tai

Department of Civil Engineering, National Chi Nan University, Puli, Nantou 545, Taiwan
(yctai@ncnu.edu.tw)

A fundamental issue for describing gravity driven flows is the search for “optimal” coordinate. Bouchut and Westdickenberg (2004) have proposed a general coordinate (BW) for arbitrary topography. The unified coordinate system (UC), which is recently developed for computational fluid dynamics, combines the advantages of both Eulerian and Lagrangian systems, so that the coordinate moves with some pseudo-particle which can coincide with some singular surface within the flows. By utilizing the benefit of the BW coordinate and UC, a new model of gravity driven flows over general topography is derived, in which the erosion and deposition processes at the bed are considered. The depth-integrated mass and momentum equations are presented in the time-dependent and terrain-following coordinate system, which coincides with the interface distinguishing between the static and flowing layers.