



## **Numerical simulation of coastal flooding after potential reactivation of an active normal fault in northern Taiwan**

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Rapid coastal flooding from seawards may be resulted from storm surge, tsunamis, and sudden land subsidence due to fault activities. Many observations and numerical modeling of flooding have been made for cases resulted from storm surge and tsunami events; however, coastal flooding caused by a potential normal faulting event nearby coastal areas is rarely reported. In addition to the earthquake hazards from fault rupturing and ground shaking, the accompanied hazards of earthquake-induced flooding is also important to be investigated. The Jinshan area in northern Taiwan was reported to have been flooded by a tsunami event in the year of 1867 possibly resulted from the reactivation of the Shanchiao normal fault offshore. Historical records have shown that the Shanchiao Fault that extends from Shulin along the western edge of the Taipei Basin to the town of Jinshan may have also ruptured in the year of 1694. The rupturing event has created a depression on the western side of the Taipei Basin that was later filled by sea water called the Taipei Lake. The geological conditions in northern Taiwan provide an opportunity for numerically simulating the dynamic processes of sea water flooding nearby the coastal area immediately after an earthquake-induced normal faulting event. In this study, we focused on the potential active normal faulting that may occur and result in an expected catastrophic flooding in lowland area of Jinshan in northern Taiwan. We applied the continuum shallow water equation to evaluate the unknown inundation processes including location, extent, velocity and water depths after the flooding initiated and the final state of the flooding event. The modeling results were well compared with borehole observations of the extent of previous flooding events possibly due to tsunami events. In addition, the modeling results may provide a future basis for safety evaluation of the two nuclear power plants nearby the region.