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Reactivation of the Shanchiao Fault and its Implication to the Variation of Landforms in Taipei Basin

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The Shanchiao fault, located to the west of the Taipei Basin in northern Taiwan, is a highly active normal fault that has a left-slip component and fault length of over 40 km.Due to the movement of the Shanchiao fault, the depth of Tertiary basement in the Taipei Basin is at least 700m.We suggest that the Shanchiao fault still has the potential to induce subsidence in the Taipei Basin under present-day extensional and transtensional regimes of northern Taiwan. In order to characterize the coseismic ground deformation of different seismic moment-magnitude, we construct a three dimensional fault plane of the Shanchiao fault and model the behavior along the Shanchiao fault with a dislocation model. When the seismic moment-magnitude reaches 6.5, the hanging wall of Shanchiao fault could subside over 1 m. The maximum subsidence value is over 2.1 m and the area subsidence below sea level is about 40 Km2 when a moment-magnitude 7 earthquake occurs along the Shanchiao fault. In addition, we believe that the fault has a larger slip around the Kuandu area after the model result compare with the depth of Tertiary basement in the Taipei Basin and prehistoric earthquakes along the Shanchiao fault. Based on the topography changes due to coseismic deformation in a potential magnitude 7 event induced by reactivation of the Shanchiao fault, a 2D inundation model was adopted to simulate several inundation scenarios, including potential flood inundation below high tide condition and under various return-period design rainfall events. The predicted inundation maps based on various return-period flood events can provide information to assess potential earthquake-induced inundation hazards.