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The formation and extent of earth fissure in Shuangbutou, Beijing

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A 8.6-km-long earth fissure began to form in 2013 and currently affect the area in eastern Beijing plain. This earth fissure represent a potential threat to the groundwater that sustains growth in new downtown area of Beijing. An integrated survey program, including InSAR, hydrogeophysic survey and trenching, has been condected to investigate the formation and extent of the fissure. This work has allowed us to understand the processes and characterize earth fissure. InSAR result indicate the fissure in subsidence profiles occur near the part of the profile where its curvature is greatest and it is convex upward. The trenches demonstrated that the physical characteristics of this earth fissure isn't typical of similar fissures that formed in Northwest sites as a result of neotectonic activity. The ERT results across the fault suggest that the fault doesn't cut througth the whole quaternary strata and subsurface fault-associated depth was restricted to 27-43m. The occurrence and the development of the earth fissure closely parallel the pre-existing Medio-Pleistocene fault (Nanyuan-Tongxian fault) and initiated in the fault zone close to the footwall. The fissure originates within the unsaturated clayed strata at a relatively shallow depth and show a tensile failure with negligible vertical offset. The results of hydrogeophysical method and trench indicate that it migrates downward and terminate near the saturated–unsaturated interface. The survey results suggest the tensile-induced fissure was mainly caused by groundwater-level decline rather than natural tectonism.