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# Avdar, an active fault discovered near Ulaanbaatar, Capital of Mongolia: Impact on seismic hazard.

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The active tectonics of Mongolia is influenced by the India-Asia collision and the Baikal rift extension. At the center of the country, the region of Ulaanbaatar is considered relatively less active than the western part that has experienced four great earthquakes in the last century. However, increasing seismic activity since 2005 has fostered the detection of unsuspected active faults with unknown seismic potential. This needs to be addressed for a proper assessment of seismic hazard to Ulaanbaatar.

Here we present preliminary results on the Avdar fault, one of the three newly discovered active faults within the region of Ulaanbaatar. Using remote sensing data (satellite images and DEM), field observations (microtopography), trench excavations and dating (OSL and radiocarbon), we document the geomorphologic expression of the Avdar fault and its Holocene to late Pleistocene palaeoseismic record.

The fault, oriented NNE-SSW, has a clear expression on 0.5-m-resolution Pleiades satellite images and displays systematic modifications of the drainage system (deflections, offsets and sediment traps). It may be traced over a ∼50-km-long section up to 30 km from Ulaanbaatar and only a few kilometers from a new airport project area. In the field, the surface expression of the fault is relatively weak and mostly expressed by smooth features. This indicates that the last event may be rather old and is consistent with the low deformation rate observed in the region.

We excavated two 3-m-deep trenches across the Avdar fault along a NW-SE direction where the scarp, though smooth, crosses active streams with recent deposits. The trenches were longer than average to compensate for the weak surface expression and ensure the main deformation zone is exposed: T1 is 60 m long and located at the edge of a small temporary stream; T2 is 40 m long and located 800 m west of T1 in a parallel stream. Seven samples (3 radiocarbon dating and 4 OSL) were collected from T1 to determine the age of paleoseismic events. These trenches expose complex deformations associated with many wide and deep cryoturbation features (e.g. cracks, metric folds, ice wedges). This phenomenon, related to present and past freeze-and-thaw processes, disrupts the observation of paleoseismic deformations over the main part of the trenches. The challenge is to separate the deformation due to seismic events from cryoturbation and to date the two processes.

The results of this study will be included in the seismic hazard assessment for the capital of Mongolia, Ulaanbaatar.