



## **February 2011 sensitive clay landslides at the Çöllolar coalfield, eastern Turkey**

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The Elbistan basin is an intramontane basin, which is located in the eastern Turkey and bound by the Taurus and Antitaurus Mountains. The basin covers an area of 900 km<sup>2</sup> at a mean elevation of about 1200 m. The basement rock in this field is karstic limestone, which is overlain by a thick layer of clay (>100 m), followed by 20-50 m thick Lignite series that is overlain by the 20-50 m thick Gytja sequence. These deposits are overlain by Quaternary deposits, comprising the top surfaces of the terraces of the Hurman River, which drains the surface and ground water from the surrounding hills to the northeast towards the center of the Elbistan basin.

The Çöllolar open pit mine, situated in the northwestern sector of the Elbistan basin, contains 90 km<sup>2</sup> of mineable coal which has been excavated since 2008. In February 2011, two landslides in which 10 workers were killed, occurred in this field. Of the two landslides, the 2nd and largest which covers an area of ca. 2.3 km<sup>2</sup>, was caused by the collapse of the northeastern wall of the open-pit mine. The failure was made of successive rearward collapses with the debris flowing into the open-pit. In this study, we focus on the geologic factors that led to instability and the trigger of the landslides. To reveal these factors, we employ sedimentological and geotechnical analysis of deposits, with a special emphasis on the Pliocene lacustrine carbonaceous sediments and the sensitivity of the overlying Quaternary clays.

First results from the fieldwork and the mineralogical composition and physical properties of the collected samples indicate that the landslide was caused by the liquefaction of one of the layers within the thick sequence of this part of the Elbistan basin based on the flow style of the movement and nature of the failure. In brief, we conclude that massive failures at the Çöllolar coalfield are unique examples of sensitive clay landslides occurred in a subtropical arid region beyond the extent of Quaternary glaciations.