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Particle size and shape results from a landslide area in Kulcs, Hungary

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Formation mechanism of landslides along the west bank of the Danube is still unclear. In this study we examine red clay samples from the 2014 landslide, Kulcs, Hungary. The main aim of our study is to determine if there are differences in the grain size and morphology among the samples from the recently moved sliding surface, the nearby area (samples from layers above and beneath the sliding surface) and the seemingly stable corresponding layers (nearby trenching profile and riverside samples). On the basis of particle-size analysis, particle shape analysis and scanning electron microscopy, all of the samples were affected by varying degrees of physical and chemical alteration. Parameters of particle-size distribution and shapes are presumed to be responsive to the different methods of transport, as well as the reworking and dissolving processes after deposition of the sediments. The results of grain size distribution analyses show that both the samples from trenching profile and riverside are weathered, and the trenched material is even reworked. The alteration in the sliding surface and above it is more intense than below the sliding surface. According to the particle shape analyses of quartz in the silt fraction (20 μm-63 μm), morphological parameters (e.g.solidity, circularity) of the samples from trenching profile differ significantly from the other samples. SEM analysis indicates that calcite occurs in various form (small grains (<10 μm), big concretions (0,5-2 mm) and pore filling material), while feldspars show higher variability in grain size and morphology than quartz grains.
Our results indicate that samples from different sampling points (different parts of the landslide area) can be well characterized (/distinguished) by grain-size distribution and shape parameters. The study was supported from FK128230.