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Megalandslide in the Northern Caucasus foredeep (Uspenskoye, Russia): geomorphology, possible mechanism and age constraints

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Although worldwide datasets reveal that majority of giant landslides have occurred within the steepest portion of the Earth′s landsurface, recent observations have brought evidence that some of the largest landslides originated in the low-relief landscapes and moved upon very gently inclined slip surfaces. Extremely large landslide with volume ∼2.8 km3 was detected on the right bank of the Kuban river in the Northern Caucasus foredeep (Russian Federation). Megalandslide with gently inclined (<5°) slip surface originated within the low-gradient landscape formed by weak, nearly horizontally inclined clay-rich Miocene strata. Field analysis of numerous outcrops within the landslide body together with interpretations of DEM and satellite images revealed two stages of gravitational emplacement. Major phase was connected with rather catastrophic rotational blockslide transforming in the distal part to the earthflow. Secondary phase was attributed to the steepening of the landslide toe due to the lateral erosion of the Kuban river. As a consequence, multiply rotational collapse of the distal part of megalandslide took place. OSL and radiocarbon dating of both deformed soil and loess-like deposits overlying landslide body suggest possible formation of the Uspenskoye megalandslide between ∼18-35 ka BP. Inferring trigger of the major megalandslide movement remains rather speculative, but we prefer palaeoseismic hypothesis in connection with rupture of some Late Quaternary fault in the vicinity of landslide area. Area of megalandslide is recently subject of intensive denudation marked by activity of numerous shallow landslides, gully erosion and dynamic aggradation (>2 m during last ∼300 years) of material within valley floors.