Geophysical Research Abstracts
Vol. 12, EGU2010-9265, 2010
EGU General Assembly 2010

YANGTZE project: Investigation of mass movements in the Three Gorges Reservoir Area (P. R. China)

Dominik Ehret, Joachim Rohn, Johannes Wiedenmann, René Rudolph, Karel Otte, Stefanie Ernstberger, Susan Eckstein, and Christian Dumperth

University of Erlangen-Nuremberg (Germany), Department of Applied Geology, Erlangen, Germany
(ehret@geol.uni-erlangen.de, +49 9131 85-22688)

Within the German YANGTZE Project, mass movement hazard is investigated for the Xiangxi Catchment which is part of the Three Gorges Reservoir (P. R. China). The objective of our sub-project is to investigate the impact of the Three Gorges Reservoir on slope stability and (re-)activation of mass movements. Within this paper first results of investigations on mass movements in the Xiangxi Catchment that were started in summer 2008 are presented. They show a significant correlation between mass movement distribution and activity on the one hand and lithology and altitude on the other hand.

In Xiangxi Catchment, correlation between geology and occurrence of mass movements can be studied ideally as most of the geological formations outcropping in the reservoir area can be found there. Furthermore, the mouth of Xiangxi River is quite close to the Three Gorges Dam so that the impact of the impoundment is distinctive in the Xiangxi Catchment.

In 2008 and 2009, about 70 km^2 were mapped geotechnically. The mapping was done for (a) the backwater area of Xiangxi River influenced by the impoundment of the Three Gorges Reservoir (from Yangtze River to Gaoyang Town), (b) Quyuan Valley as a sub-catchment of Xiangxi Catchment, and (c) along the main roads from Gaoyang Town towards Gufu City and towards Shennongjia Nature Reserve. The investigated area comprises marine and continental sedimentary layers from Cambrian to Jurassic Period. The lithology of these layers is dominated by carbonates (limestone, dolostone and marlstone) on the one hand and clastic sediments (shale, mudstone, siltstone, sandstone, and conglomerate) on the other hand.

A total of 180 mass movements was found and mapped. Mainly rotational or combined rotational-translational landslides, but also some rockslides and rockfalls were found. As expected, a strong correlation between lithology on the one side and occurrence and activity of mass movements on the other side could be found. In the study area, Jurassic, Silurian, and Ordovician strata are characterised by high mass movement susceptibility.

The design water level of the Three Gorges Reservoir is at 175 m a.s.l. Thus, mass movements situated completely or partly below 175 m a.s.l. are directly influenced by impoundment and operation of the Three Gorges Reservoir. Our investigations indicate a significant correlation of altitude and activity of mass movements in the Xiangxi Catchment. Whilst 52 % of the mass movements partly below 175 m a.s.l. are currently active, only 32 % of the mass movements completely above 175 m a.s.l. are currently active.