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Studying and understanding the environmental impacts of the Three Gorges Dam in China

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Since its planning phase and its completion and start of operation in 2009, the Three Gorges Dam (TGD) at the Yangtze River, has been discussed in a controversial manner. Due to considerable resettlements along with the associated expansion of the infrastructure network and large-scale shifts in land use and management, the TGD in Central China is among the most prominent human-induced examples for large-scale environmental impacts. As a consequence of the rapid ecosystem changes, the region is largely characterized by an enormous boost of typical geo-risks such as soil erosion, mass movements, and diffuse sediment and matter fluxes into the reservoir.

Within the joint research project YANGTZE-GEO, Chinese and German scientists jointly focus on the human-induced environmental changes in the reservoir of the TGD after the impoundment of the Yangtze River and its tributaries. An integrative approach was set up in order to combine multi-scale investigation methods and state-of-the-art techniques from soil science, geology, hydrology, geophysics, geodesy, remote sensing, and data survey and monitoring. By means of eco-hydrological and soil erosion modeling, geo-statistical approaches such as digital soil mapping and Artificial Neuronal Networks, spatially and temporally differentiated simulation of the water budget as well as the balance of diffuse matter such as phosphorus and sediment, three-dimensional dynamic modeling, seismoacoustics and terrestrial radarinterferometry, multi-temporal land use classification from recent and historical remote sensing data and laser scanning, the research aims at (i) the understanding of the mechanisms and anthropogenic and environmental control factors of the environmental changes in the highly dynamic region and (ii) the development of spatially explicit land use options and recommendations for a sustainable land use management.

Finally, based on the integrate modelling, we aim at the conception of a monitoring- and measuring network and early-warning system including local and regional authorities. Thus, the studies will contribute to a better understanding of the dimensions and dynamics of the ecological consequences of such large dam projects at the Yangtze River and worldwide.