Geophysical Research Abstracts
Vol. 14, EGU2012-1803, 2012
EGU General Assembly 2012

Cohesive Sediments in Groyne Fields along the Elbe River

G. Hillebrand, P. Heininger, T. Krämer, C. Möhlenkamp, J. Pelzer, D. Schwandt, and E. Claus
Federal Institute of Hydrology (BfG), Koblenz, Germany (hillebrand@bafg.de)

The ICPER aims at establishing a sediment management concept both in terms of quantity and quality by 2013. To this end, the key processes of sediment transport and budget have to be defined under regular and under extreme conditions. Sediment budgets in regulated rivers are strongly influenced by lateral exchange processes. This study focuses on the function of groyne fields acting as source and sink for cohesive sediments and particle-bound contaminants along the Elbe. One specific aim is to assess the amount of erodible contaminated sediments within the groyne fields as basis for establishing a sediment management plan.

In several field campaigns in 2010 and 2011, 282 groyne fields between Elbe-km 129 and 578 were probed by sounding rods, push core samplers and van Veen grabs to estimate the sediment composition of the deposits. The sediments were subjectively classified on site as “gravel”, “sand” or “mud” and the total amount of mud per groyne field was categorized as “much”, “little” or “none”. 33 groyne fields were identified as gravelly, 118 as sandy and 92 as muddy. Mud content of 73 groyne fields was considered high, low in 59, no mud was found in 128 groyne fields.

The estimated sediment inventory was analyzed for possible correlations to a set of parameters including geometric characteristics of the groynes and the groyne fields, river alignment or the grain size distribution of the adjacent main channel. As an example, strong interdependency was found for groyne fields with high mud content between conventional groyne structures when they were connected to backwaters and exhibited longitudinal ridges within the groyne field. For validation concerning the different subjective estimates of all the research groups involved in the field campaigns, group-specific subsets were analyzed and no significant deviation in the observed correlations were found.

The analysis is used to extrapolate the findings to the whole river reach between Elbe-km 0 and 585. Additional studies of a small subset of muddy groyne fields will be carried out in terms of a more detailed survey of the sediment material and in situ measurements of erosion stability to determine the risk of remobilization during flood events.