



Sedimentary record of Warta river floods in summer 2010 and winter 2011 nearby Poznań, W Poland

Katarzyna Skolasińska, Witold Szczuciński, Marta Mitreęga, Joanna Rotnicka, Robert Jagodziński, and Stanisław Lorenc

Institute of Geology, Adam Mickiewicz University in Poznań, Poland, katskol@amu.edu.pl

The Warta River valley nearby Poznań (W Poland) represents a meandering lowland river changed during the last 150 years by hydro-engineering works. Floods represent a major natural hazard in the region. However, historical records are not complete - particularly for former rural areas. Thus, sedimentary record may potentially offer additional insights into the flooding history.

The big floods in the summer 2010 (the largest during the last 31 years) and winter 2011 offered opportunity to study their sedimentary record. The particular purposes were to identify sedimentary characteristics of summer and winter floods, interpret various phases of particular floods in the record, and assess impact of early post-depositional changes of the flood deposits.

The surveys were conducted in six areas just after the floods and were repeated after several months, one and two years. The deposits spatial extent, thickness, surface bedforms and sediment type were assessed in the field. Sediment samples were further investigated for grain size distribution, organic matter content, roundness and sand grains surface features (SEM).

The sandy flood deposits mostly build natural levee, side bars (<5 m from the channel bank) or crevasse splays (<40 m). They were up to 10-15 cm thick for the summer and 30-35 cm for the winter flood. The sands were mostly fine grained, well sorted and fine skewed. Their structures were massive with rare cases of climbing ripple lamination and planar cross laminations (only in crevasse splays). Vertical grain size changes in levee deposits revealed pensymmetric and/or reverse grading interpreted as effect of changing velocity during the rising water level. The sand grains were similar to the river channel sands and dominated by polished and sub-rounded quartz grains with preserved dissolution and dulled surface microfeatures. Further from the channel bank (few to few hundreds of meters) only discontinuous up to few mm thick organic rich mud layer was left, which after the summer flood was covered by algal mats. However the mud and mats were quickly reworked by new vegetation. The follow up surveys revealed that the preservation potential of flood deposits is low to moderate (only for sandy deposits).

The studied cases proved that in the engineered river channels the major record of floods may be preserved in the levees next to river channel, but not on the flooding terraces. The record of winter flood is composed of slightly coarser and thicker deposits, and it may be due to bigger capacity of sediment transport by the colder water and lower surface friction due to reduced plant cover. The vertical grain size distribution changes may be interpreted in terms of duration and variations during the particular floods.

The study was supported by National Science Centre grant No. NN 304 105240.