



Evolution of floodplain sedimentation during the last millennia in the Ardenne Massif (Belgium)

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In the Ardenne massif, several periods of increased sediment deposition have been identified during the last millennia. They can be correlated to increasing anthropogenic land use pressure. The majority of the sediments found in floodplains were deposited in the last 4000 years, and in many cases even in the last 1000 years.

In the Amblève catchment, the first increase in sediment deposition of the Holocene occurred during the Bronze Age (3200 BP), related to first deforestations and crop cultures in the area. Several organic depositions have occurred between 2700 BP and 1000 BP and probably indicate low anthropogenic pressures or more humid periods. From the 11th century onwards, there was an increase in sedimentation, and alluvial deposits contain more charcoal. A second important increase in sedimentation is observed in headwater catchments at the end of the 14th century, which can be related to the development of many iron factories. In the Ardenne massif, more than 300 iron factories existed between the 14th and the 19th century and about 20 ha of forest were cleared each year for the consumption of a refining forge or a blast furnace.

Analysis of slag concentration produced in former factories and redistributed in the floodplain allows us to reconstruct the evolution of floodplains since the inception of the iron industries. The results show that not all floodplains in the Amblève catchment are equally sensitive to catchment disturbances. In the headwater stream (Chavanne river, 10-20 km²), about 80 cm of sediment has been deposited since the inception of the iron industries (towards 1540 AD). In the lower Lienne valley (100-150 km²), almost no sediment accumulation occurred in the floodplains after the beginning of iron melting (towards 1400 AD). This difference could be explained by the larger stream power of the Lienne river (100-120 W/m² for Q_b).