



Historical impact of dams and weirs on the fluvial system in the low order rivers of central Europe

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Central European streams have been influenced by humans to varying degrees for at least ~ 1000 years. In the low mountainous areas of central Europe, rivers were commonly exploited for energy production (mills) or irrigation (hay production). Separately, changes to these fluvial systems have been documented throughout this same time period, but generally attributed to changes in land use. In particular, increase in agriculture at this time is known to have caused widespread hillslope soil erosion and therefore increased the sediment load delivered to these rivers. However, valley bottom damming is also an important river modification that has been largely overlooked within Europe, even though the history of damming low-order streams reaches back until at least medieval times. In this study, we aim to track the historic changes in the fluvial system of two central European 1st to 3rd order mountain catchments and attribute them to either i) land-use change or ii) valley bottom damming, or some combination of both. As a first step, we analyse the changes of dam location and density, river flow pattern, sinuosity, and land-use in the five separate time periods available from i) historic maps: 1808–1861 AD (Bayern), 1840–1861 AD (Hessen), 1844–1848 AD (Bayern), and ii) topographic maps from the mid 20th century and 2012. Qualitative data from maps older than 1800 AD are also integrated into the database (i.e. dam location only, not morphology), along with Corine Land Cover data. These results highlight the utility of combining historical and modern information on river morphology to determine the river response to land use change and flow regulation.