



The impact of a dam reservoir-induced base-level rise on mountain river morphology. New insight from the gravel-bed Smolnik River in the Polish Carpathians

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River reaches upstream from dam reservoirs, where water level fluctuations occur due to backwater effects, may be utilized as a field laboratory of base-level rise effects on river morphology. Here I present the results of the aerial photo-based (1963-2012) reconstruction of the long-term morphological adjustments of the small, gravel-bed Smolnik River in the backwater of the Rożnów Reservoir (1941) (Southern Poland). Channel narrowing and the formation of a relatively stable single-thread, high sinuosity channel with densely vegetated banks were observed in this zone due to forced fine and coarse sediments deposition connected with the backwater effects of the reservoir. This study has shown that specific river morphology may relatively quickly develop in the backwater zones of dam reservoirs as an effect of disturbances in the sediment and water transport connected with the base-level rise. This study also suggests that long-term river morphological adjustments in the backwater seem to be significantly controlled by the dynamic feedback between the fine sediments deposition and vegetation expansion that facilitate the development and maintenance of a single-thread, high sinuosity channel.