Geophysical Research Abstracts,
Vol. 11, EGU2009-1050, 2009
EGU General Assembly 2009

Sediment record in a small reservoir in W Scotland: implications of the deposition rate

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Widespread landscape responses to the deglaciation of N Britain were glacio-isostatic rebound and the development of knickpoints (KPs) in many trunk streams and their tributaries. Since KPs are abrupt steps in the long profile, they were ideal locations for mill dam construction between the 16th and 19th centuries in Scotland. Data from the sediment infilling a small mill dam near Loch Lomond are reported here with the goal of understanding the sedimentation history of the reservoir and its implications. Data were derived from analyses of a sediment core through the mill dam sediments and an exposed sedimentary section adjacent to the coring site. Stratigraphic description and analyses on the core, along with dating using analyses of ^{137}Cs, and ^{210}Pb isotopes, show that the dam was probably built up around 150 years ago and probably functioned for about 50 years before the dam wall was breached, leading to fluvial incision through the sediments impounded in the reservoir. The sedimentary record indicates that coarser material has been deposited following dam breaching. This observation may indicate an increase in the river's erosive capacity but since the channel perimeter up- and down-stream of the dam is mainly composed of very cohesive sediment and bedrock, dam breaching seems to have had little impact on channel morphology. This finding highlights the need to take into account the total landscape setting of a dam when considering the impacts of dam failure. Settings such as northern Britain, which is dominated by Holocene surface uplift and bedrock substrates, are probably generally associated with minimal downstream impact when sediment is released from breached dams.