Geophysical Research Abstracts, Vol. 8, 09649, 2006
SRef-ID: 1607-7962/gra/EGU06-A-09649

Influence of Reservoir Sediment filling on Electricity production

S. M. Gardarsson

Associate Professor, University of Iceland, Engineering Research Institute, Department of Environmental and Civil Engineering, Hjardarhagi 2 - 6, IS-107 Reykjavik, Iceland. (sigmg@hi.is)

Harnessing the hydropower of a river with a large seasonal discharge variation requires relatively large storage volume. This is especially true for glacier rivers as the majority of the discharge is delivered during the melting season which may last only three months. Sediment transport poses additional challenges, especially in glacial rivers that carry high loads of sediment that is deposited in the reservoir, decreasing the storage capacity with time. In this study, the influence of decreased storage capacity on spillway discharge and hence electricity production for reservoirs with large seasonal inflow variation is investigated. As a case study, the Halslon reservoir, the main reservoir of the Karahnjukar hydropower project in the eastern highlands of Iceland is studied. It is predicted in the Environmental Impact Assessment for the hydropower project that sediment will fill up the reservoir in about 500 years based on the present sediment transport rate. However, the main source of the sediment is Bruarjokull outlet glacier, which is a part of the Vatnajokull ice cap, will almost disappear during the next few hundred years due to climate warming according to recent studies. Based on this, modeling shows that instead of the reservoir being completely full of sediment in 500 years, it will have at that time about 50-60% of its volume remaining as the sediment yield will decrease as a result of the decreasing glacier size. The effect of the Halslon sediment filling on electricity production, with and without the influence of climate warming, is investigated.