

Master/Project Thesis

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Impact of flow regime alteration due to hydropeaking on biogeomorphic patterns in the Alpine Rhine river

Over the last decades, flow regime alternation by hydropower production has heavily modified the natural flow regime in several Alpine rivers, with implications for a number of biological and physical processes. Frequent, rapid and short-term fluctuations in water levels downstream a dam, i.e. hydropeaking, are known to have a profound control on riparian vegetation dynamics and on biogeomorphic patterns. In this context, the use of predictive models for informing river managers on sustainable river restoration strategies is therefore fundamental.

The goal of this thesis is to investigate the effect of the hydropeaking on biogeomorphic patterns through the application of an eco-morphodynamic model developed within BASEMENT (BASEveg). The case study is a 16 km-long reach of the Alpine Rhine river in Switzerland. In particular, the thesis objectives are i) to characterize the hydropeaking signal analyzing discharge measurements for three scenarios (current situation and two management alternatives), ii) to calibrate the model on the current scenario by using different data sources (e.g. aerial images), and iii) to assess the effect of the modified hydropeaking signals on the biogeomorphic patterns. The candidate will run numerical simulations and use data for calibration and validation purposes.



Fig. 1: Alpine Rhine river nearby Sargans (F. Caponi, L. Böswald)

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Notes:

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