

Sediment load in 2022 in the small hydropower plant Susasca

Hard mineral particles transported in power waterways of medium- and high-head hydropower plants (HPPs) may cause considerable erosion damages on turbines. As a basis for optimized design and operation of such HPPs, the sediment load and its effects on the turbines are measured at HPP Susasca, east of the Flüela pass in the Canton of Grisons, Switzerland. This small run-of-river HPP has an intake on the Susasca creek (Fig. 1) followed by two underground sand trap basins. Over an elevation difference of 360 m, a penstock leads down to the powerhouse with two Pelton turbines of 3 MW at the Inn river in Susch. In the upper part of the catchment area, the Grialetsch Gletscher is on retreat (Fig. 2).

Two turbidimeters and an acoustic instrument have been installed to measure the suspended sediment concentration in the river and at the end of the sand trap. Moreover, time series of measured water levels, discharges, sediment levels in the sand trap chambers etc. are available from the control system of the HPP.

The primary goal of this thesis is to evaluate these data to quantify the water volumes and sediment loads in the creek and in the turbines in the year 2022. Furthermore, it shall be investigated how the air temperature and rainfall affect the sediment load over the year and in flood events. As an optimization of the HPP operation, it needs to be analysed how temporary HPP shutdowns in periods of high sediment concentrations contribute to the reduction of the sediment load of the turbines.



Fig. 1: Intake of HPP Susasca (Source: Hydro-Solar Water Engineering AG)

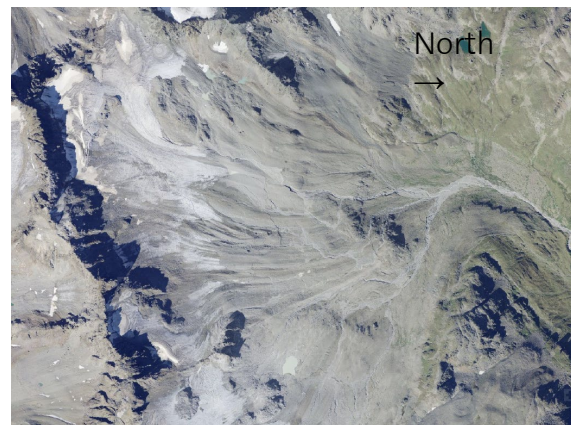


Fig. 2: Upper part of catchment area with high sediment yield (geo.admin.ch)

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Particularities:

up to 2 students for a Bachelor's thesis or Project work; report & communication in German or English; visit of the HPP possible