# Matlab Project

**PROJECT OBJECTIVES**

- Build a one day ahead forecast model of the river streamflow
- Discuss the impacts of damming up the river

**DATA AVAILABLE**

- Historical trajectories of daily streamflow
- Historical trajectories of daily precipitation and temperature

**PART-1**: **EXPECTED RESULTS:** Best data-driven forecast model

- *Linear/nonlinear*
- *Purely autoregressive/AR + exogenous information*
- *Order of the model*
- *Accuracy of the model*

Remember to justify your modeling choices.

**PART-2**: **EXPECTED RESULTS:** Numerical comparison of the performance attained by few project alternatives on different stakeholders' interests

- *Performance of Alternative-0 (i.e. no dam)*
- *Active capacity of the dam*
- *Performance of few management alternatives defined by different parameterizations of the Standard Operating Policy*

Guidelines for reservoir design + evaluation of management alternatives:

1. Design the active capacity K of the reservoir as seen in the Lab.
2. Set the limits of the regulation, i.e. maximum and minimum release functions. For the sake of simplicity, you can use linear functions. These functions should be defined as in the figure below to delimit the decision space where you are supposed to specify the standard operating policy (green line, which requires setting some parameters as in class). In particular, point C should be set in correspondence of the level $h_{max}$ (to be specified considering reasonable dam's height wrt the storage capacity), with an associate max release to be set in order to prevent overflow of water (i.e., by looking at the inflow values).
3. Simulate few (e.g. 3-5) alternative operating policies by moving some of the associated parameter values and evaluate the corresponding performance on the different stakeholders' interests (e.g., water supply, flooding, environment)
4. Compare the performance of Alternative-0 with the one of the alternatives simulated at point 3 and discuss the results.