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SWISS COMPETENCE CENTER for ENERGY RESEARCH
SUPPLY of ELECTRICITY

Demonstrator 6: SEDMIX

Controlled fine sediment release through the power waterways by using a mixing device

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In cooperation with the CTI

Energy
Swiss Competence Centers for Energy Research

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Commission for Technology and Innovation CTI

Introduction & Background

Reservoir sedimentation:

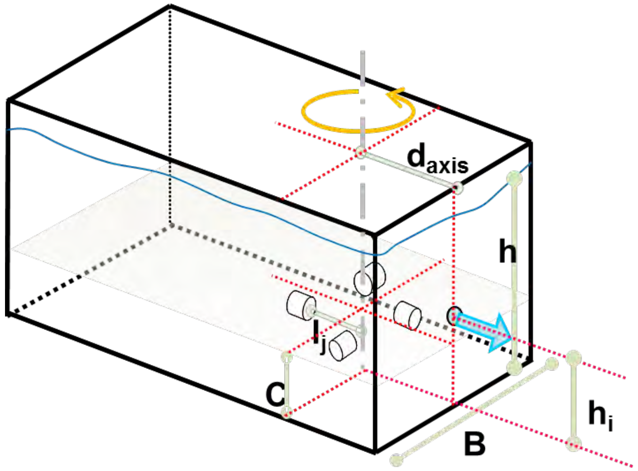
A problem of today

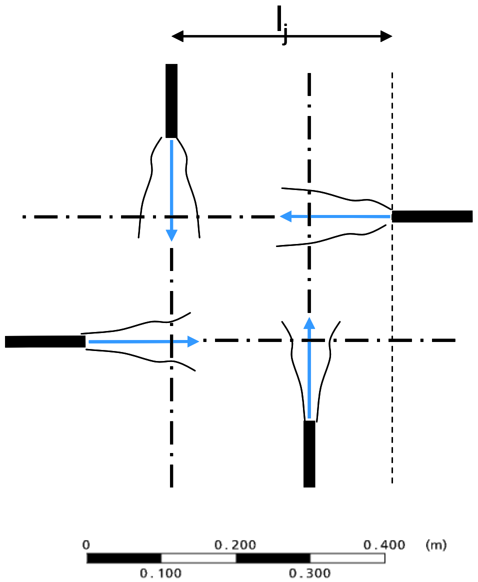
SEDMIX: Innovative mitigation measure

(Thesis Jolanda Jenzer-Althaus, 2011)

Stirring device:

- 4 perpendicular water jets
- Induce sufficient up wind vortex
- During HPP operation

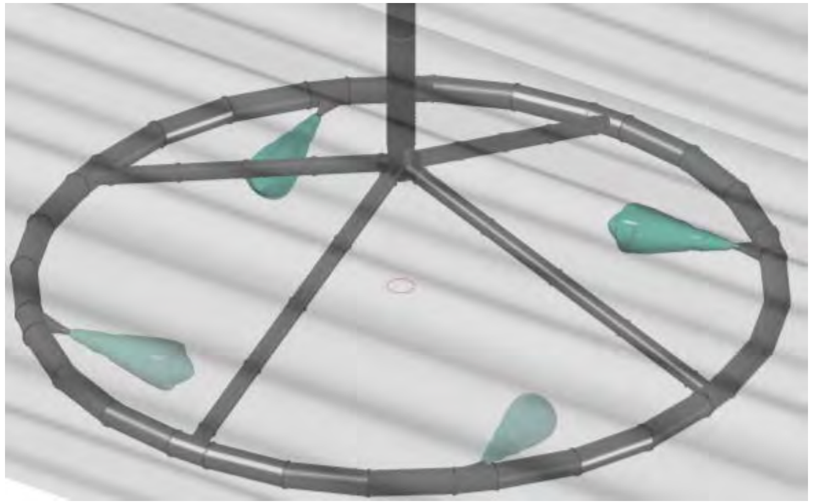




Objectives

Test with a model in the laboratory

Tests with prototype in dam sites



SEDMIX device: How does it function?

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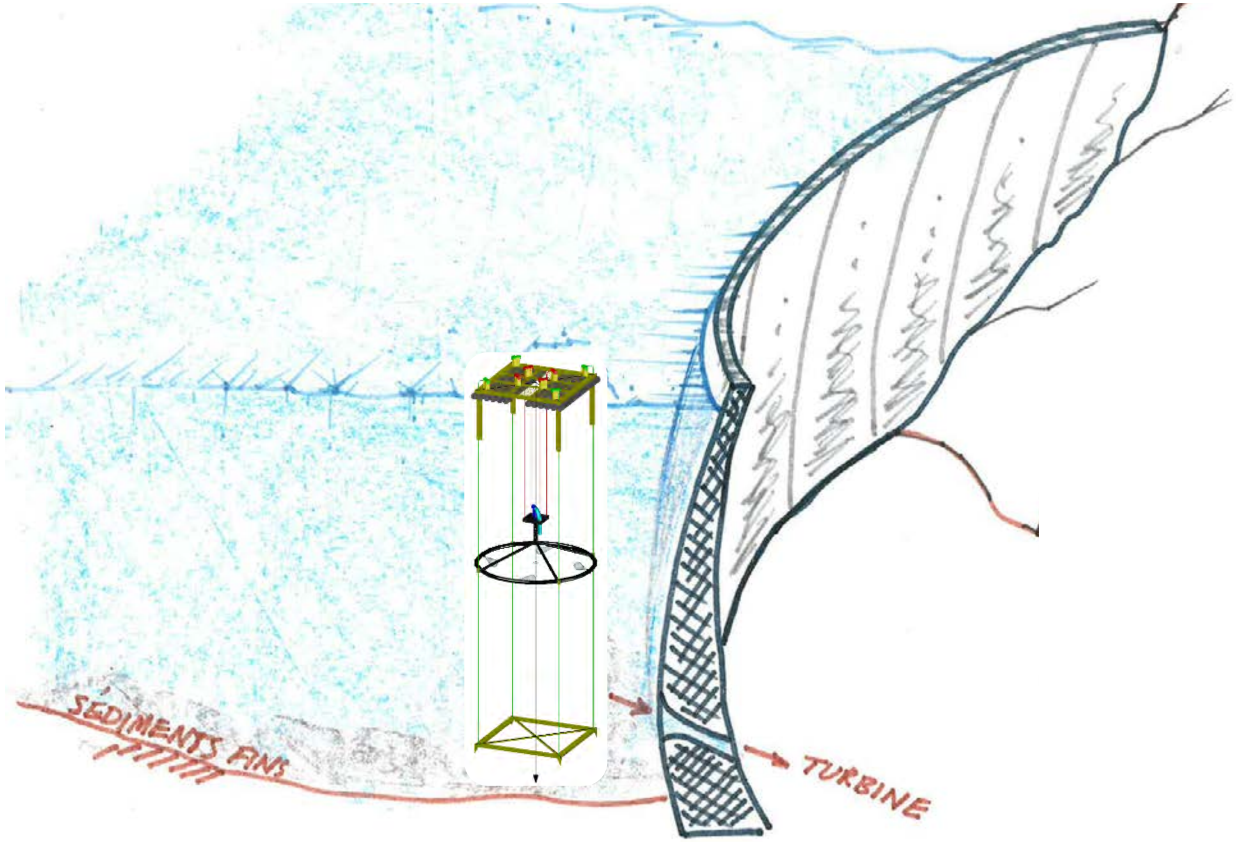

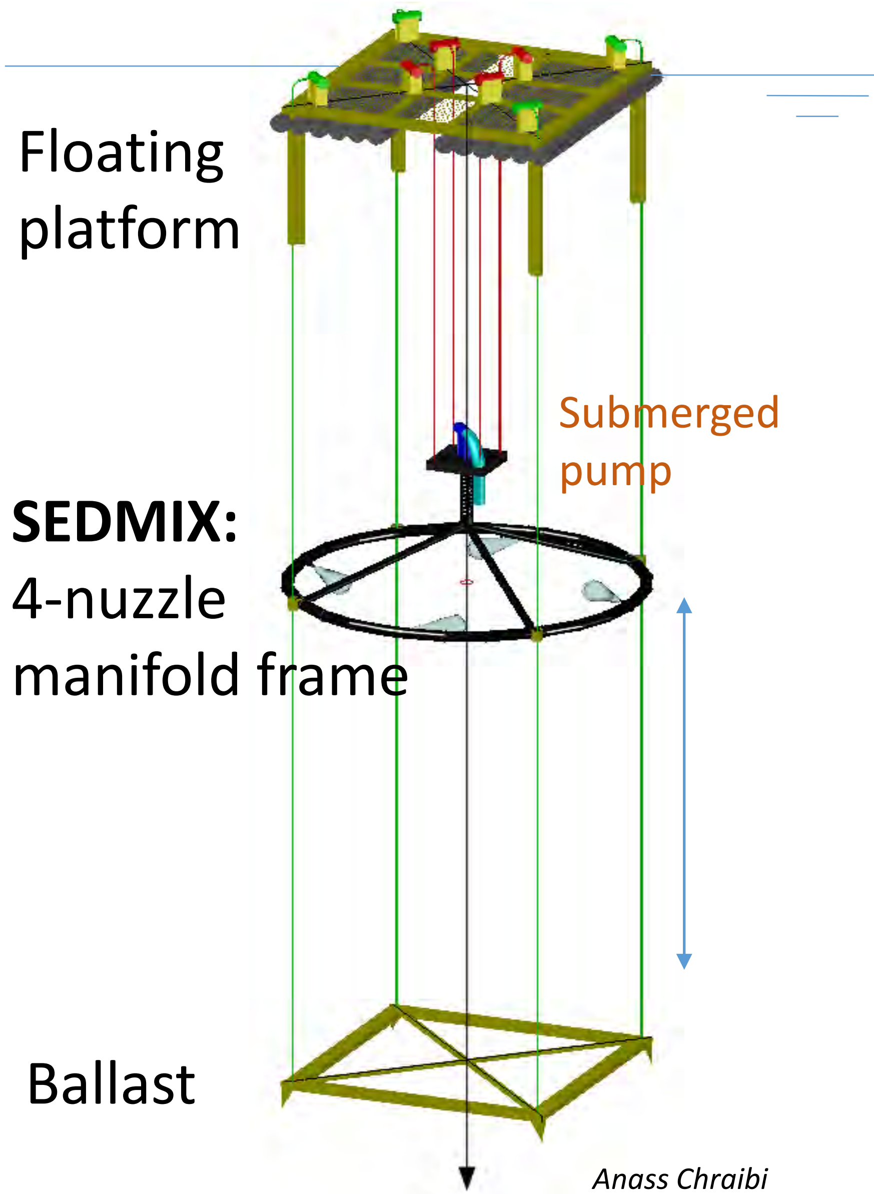

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SEDMIX prototype

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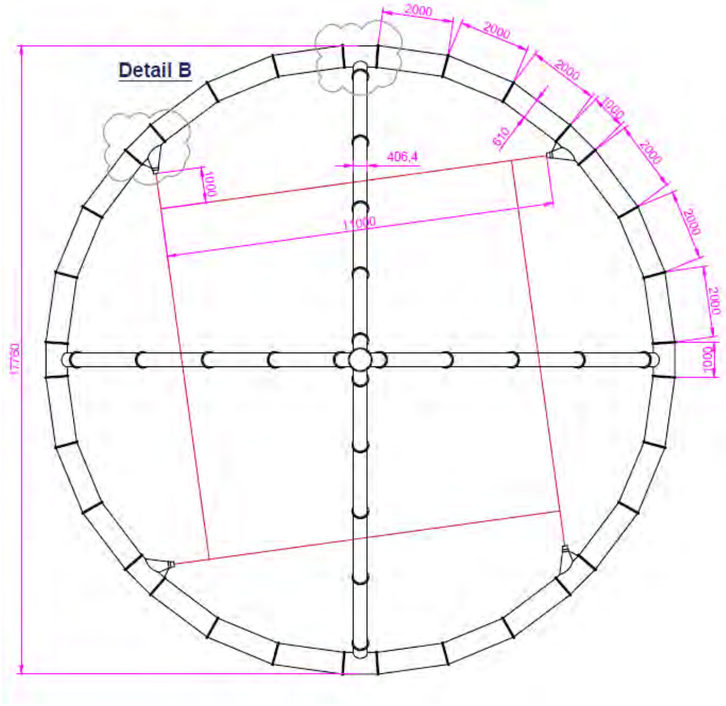
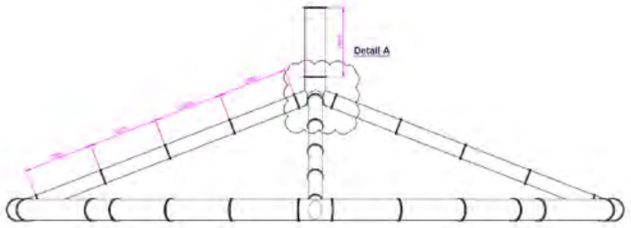
- Up scaled form Jenzer thesis (2011)
- Discharge 5 m^3/s distributed into 4 nuzzles
- Manifold diameter 18 m
- Made of steel or fiberglass
- Pipe diameter 1000 mm
- Assembled in the site
- Dissembled and moved to other sites





SEDMIX device: How is it going to be installed?

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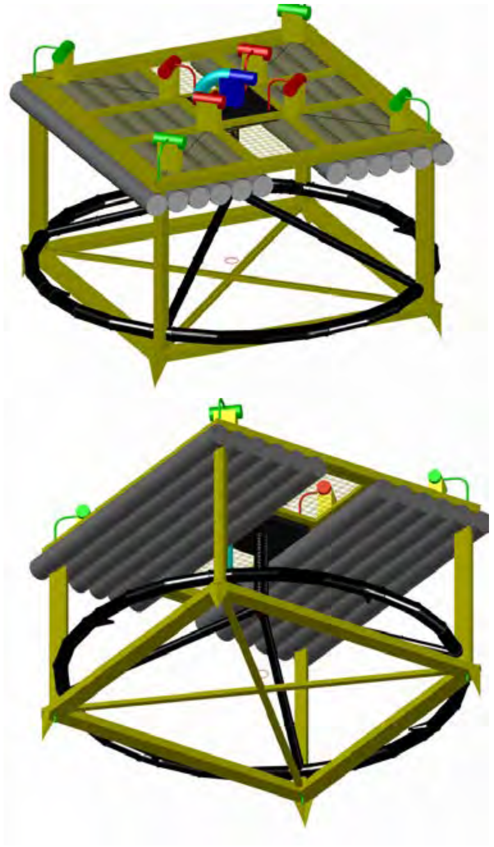
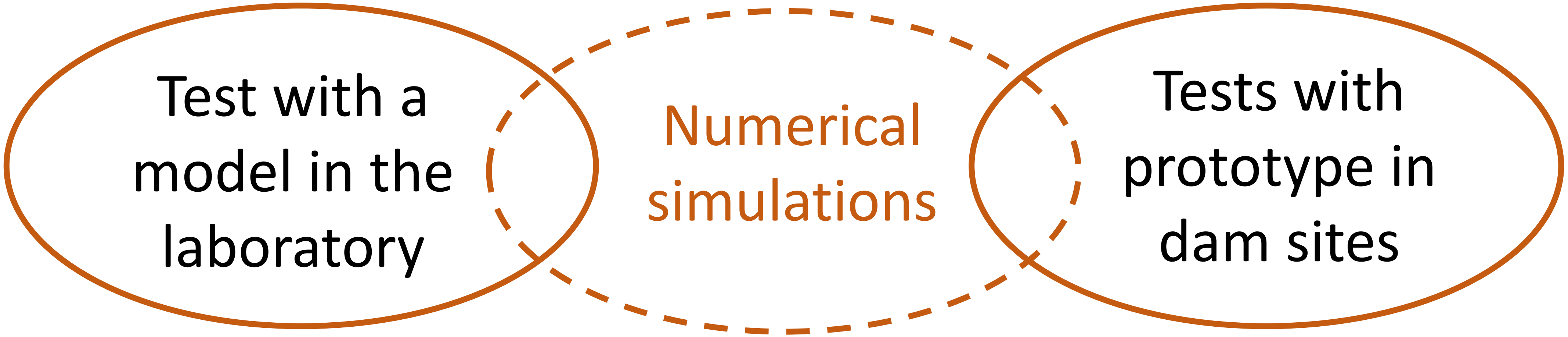


SEDMIX device: Where to place it?

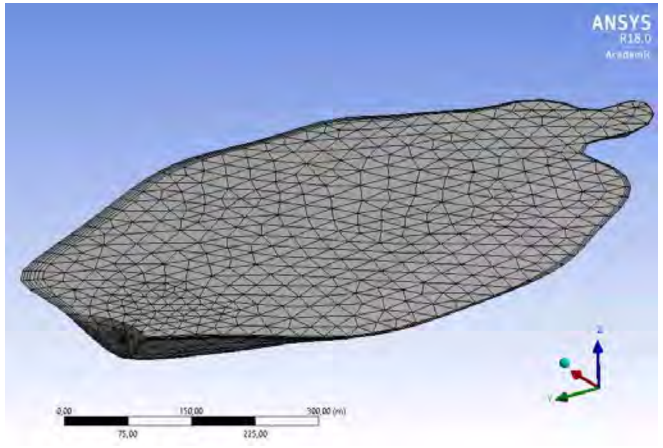


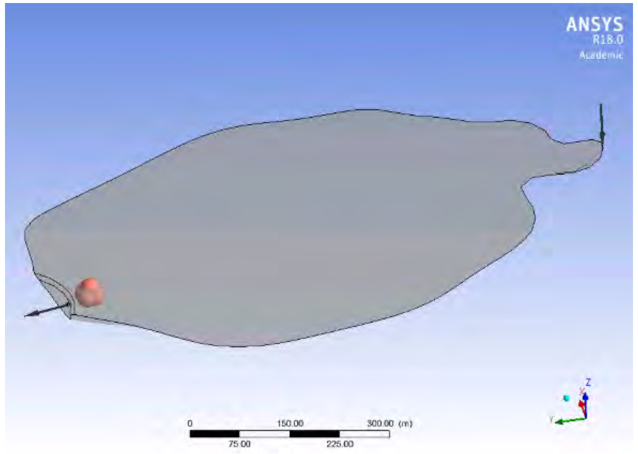
Numerical simulation of SEDMIX device

1948

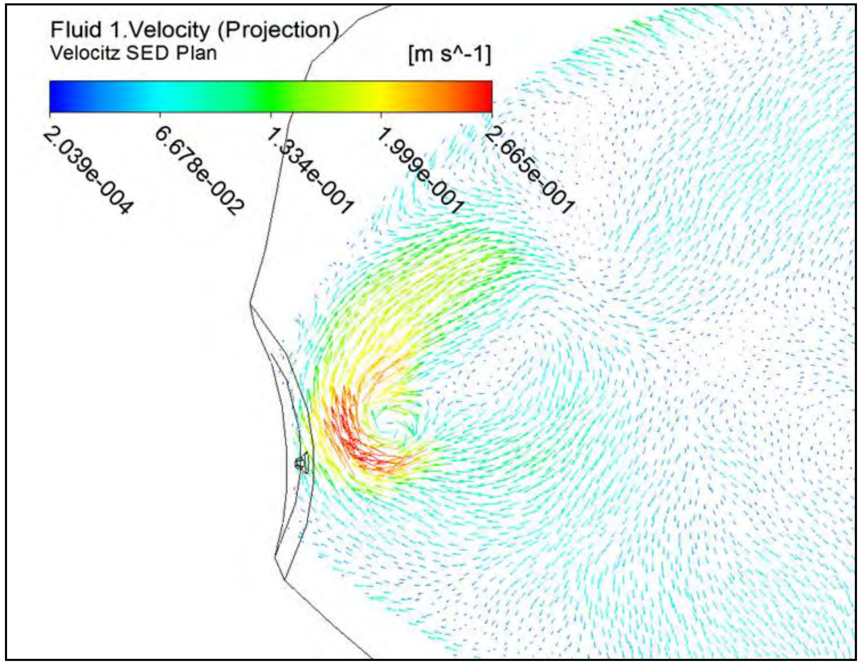
2008

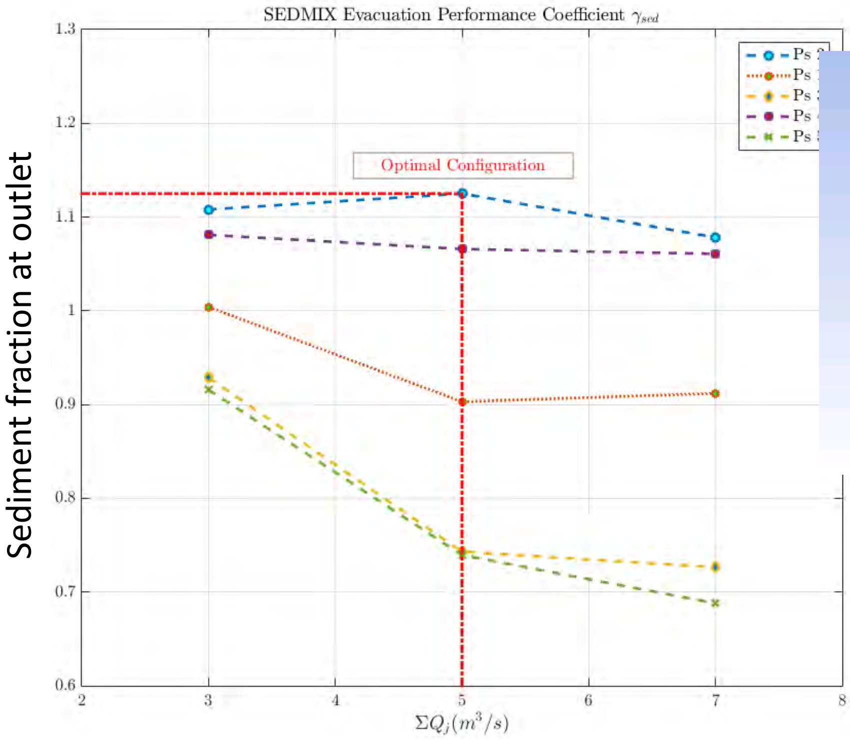
202?

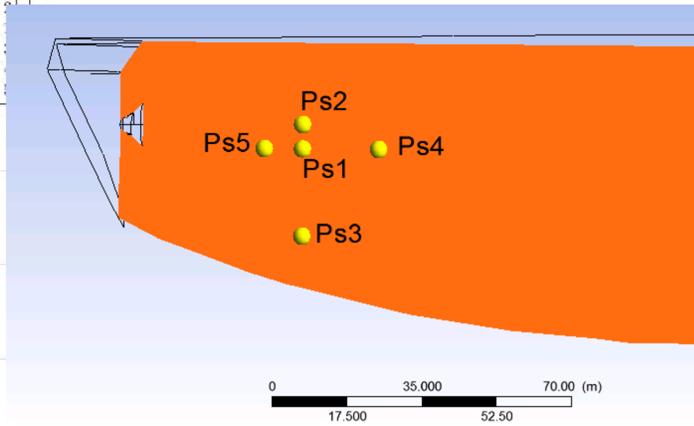




Selected results

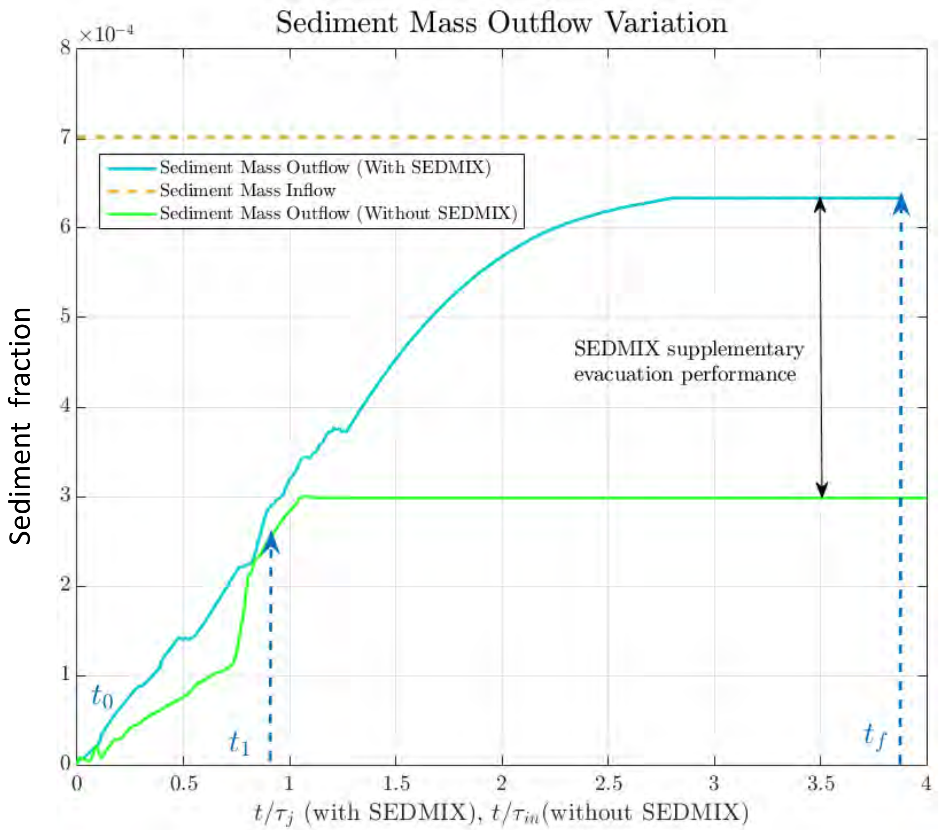


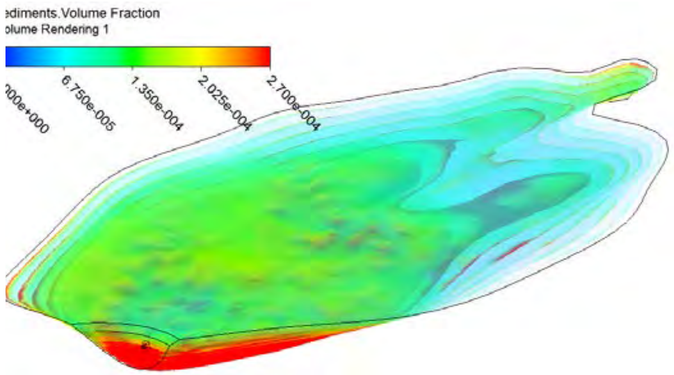


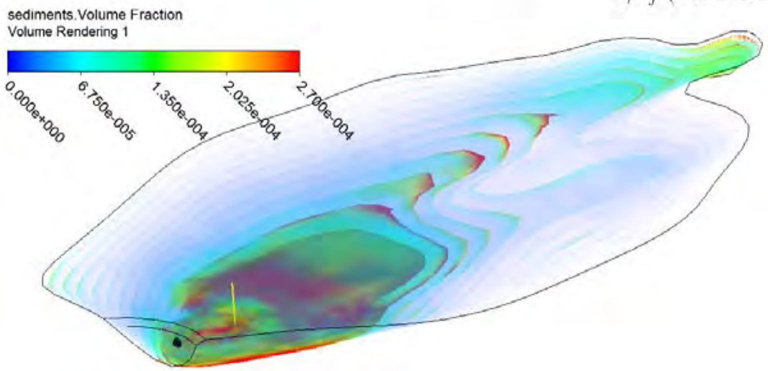


Selected results

Q_{in} constant
C_{in} constant
Q_{out} constant







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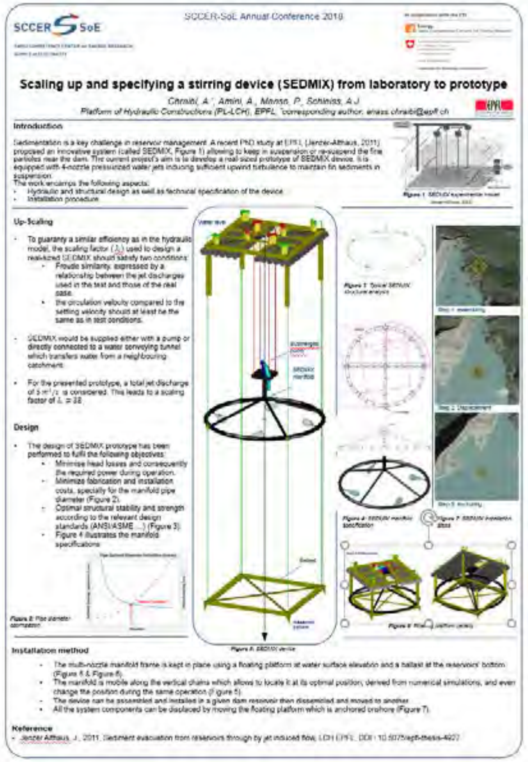
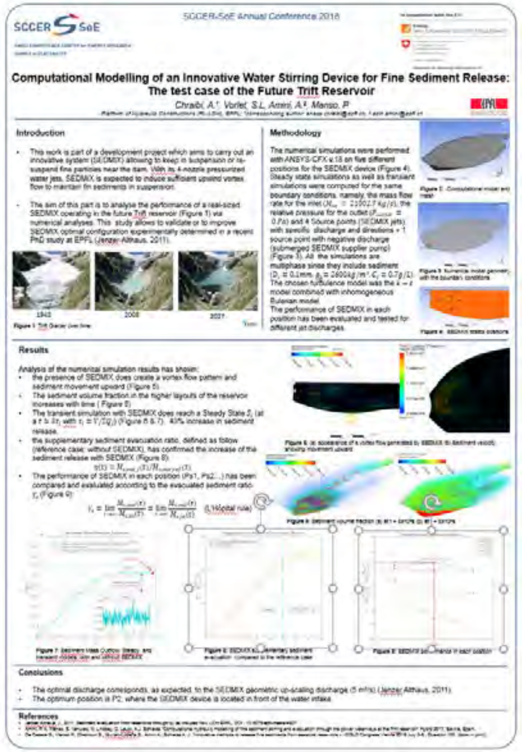
NEXT STEP…

WP1: Design, operation and logistics of the demonstrator
WP2: Catchment area monitoring
WP3: Evaluation of reservoir hydrodynamics and **device performance**
WP4: Turbine monitoring
WP5: Ecologic & Ecomorphology monitoring

Current partners: EPFL-PL-LCH, HES-So Vallais, ETHZ-VAW, ETHZ-IF, HSLU, HES Wädenswil
Industrial partners: Hydropower Plant owners

THANK YOU!





- ❑ Jenzer-Althaus J., De Cesare G., & Schleiss A. J. (2014). Sediment evacuation from reservoirs through intakes by jet-induced flow. Journal of Hydraulic Engineering, 141 (2)
- ❑ Jenzer-Althaus J., De Cesare G., & Schleiss A. J. (2016). Release of suspension particles from a prismatic tank by multiple jet arrangements. Chemical Engineering Science, 144, 153–164.
- ❑ Amini A., Manso P., Lindsey N., Venuelo S.& Schleiss A. J. (submitted to Hydro 2017 conference, Spain). Computational hydraulic modelling of the sediment stirring and evacuation through the power waterways at the Trift reservoir.