

RIVER RADAR

Live water and sediment intelligence for hydropower

Weather radar shows where the rain falls. Nothing shows what the rivers will do with it. River Radar is a sensor network in the catchments above and below hydropower plants, and the models that turn those readings into warnings.

ETH Zürich spin-off

Riverkin AG, Zurich. Founded 2024.

Paid pilots

Three of the largest hydropower operators in Switzerland.

Innosuisse

Start-up Innovation Project.

Deployed

120 field sites on four continents.

PRODUCT 1 · LIVE AND PAID

Sediment monitoring

Hydropower operators use it today to protect turbines and prove flushing compliance.

PRODUCT 2 · IN DEVELOPMENT

Flash-flood forecasting

The same network, warning a named stream before the water arrives. Innosuisse funded.

THE SKY HAS LIVE RADAR. RIVERS DON'T.

Weather radar shows where rain is falling. Government gauges sit on big rivers. The small streams where sediment surges and flash floods begin are not measured at all.

USD 12bn

lost by hydropower every year to turbine wear, unplanned maintenance and reservoir capacity

0.36%

of reservoir storage value gone each year to sedimentation

How operators measure sediment today

Crews take manual samples every 15 minutes, for six hours to five days, in flood conditions.

Samples go to a laboratory. Results arrive the next day.

Turbidity sensors give a proxy in NTU and fail well below the range that matters.



MISOX VALLEY • JUNE 2024

80 millimetres of rain in two hours. No special weather warning preceded it.

Six hydropower plants damaged

One offline for months under half a metre of mud in its tunnel

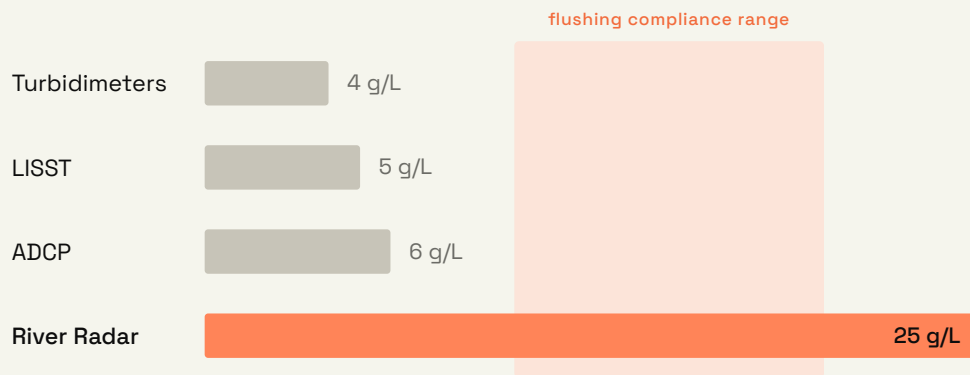
Three people died

The same water damaged the plants and the valley.

Photograph and account: Axpo

WE MEASURE WHERE EVERYONE ELSE GOES BLIND

Hydropower needs sediment readings up to 20 g/L to prove flushing compliance, and higher still to protect turbines. Every continuous instrument on the market stops far below that.



Continuous measurement range, suspended sediment. Manual grab sampling reaches any concentration, but gives one point every 15 minutes and a laboratory result the next day.

VALIDATED IN THE FIELD

During a reservoir flushing event our continuous readings followed the same curve as the grab samples taken that day, at five-minute resolution instead of one point every fifteen.

MEASURE IN THE CATCHMENT

Sensors in the streams above and below your plants. Sediment, water level and temperature.

RECEIVE DATA EVERY FIVE MINUTES

Validated automatically and sent to our platform, including from alpine sites with no cellular coverage.

USE THE DATA IN OPERATIONS

Follow events as they develop, set alert thresholds, and feed the data into what you already run.

HOW

Direct in-stream measurement

We read the water where it flows, continuously, instead of carrying a bottle to a laboratory.

Calibrated for natural sediment

Every river carries different sediment, which is where optical measurement usually falls down. We hold a reference set of 292 samples collected at 15 sites worldwide, built up over years of field campaigns.

It adapts through an event

The calibration keeps working as the sediment mix changes during a flood or a flush.

RIVER RADAR FOR HYDROPOWER

Operators run it today for sediment. Four decisions that used to wait on a laboratory now happen while they still change the outcome.

Protect turbines during high-sediment events

Act on measured concentration instead of waiting for a sample to come back from the laboratory.

Act before a surge arrives

Watch conditions build in the catchment upstream. Close intakes in time, and get crews out of the riverbed before the water rises.

Monitor flushing and prove compliance

Continuous measurement upstream and downstream, before, during and after. One record serves the control room, environmental monitoring and the regulator.

Keep crews out of the riverbed

Replace sampling campaigns that put people in the water for six hours to five days at a time.

OBJECTIVES TO 2027

Both products to TRL 8

sediment calibration and flood forecasting validated in the field

60 plants

reference deployments across Alpine operators within three years

Crews out of the riverbed

replace 6 hours to 5 days of manual sampling per flushing event

THE SAME NETWORK CAN WARN THE VALLEY

Sensors placed to protect a power plant sit in exactly the catchments where flash floods begin. Once the model can forecast a sediment surge, it can forecast the water carrying it.

WHAT WE ARE BUILDING

A local flash-flood warning

A named side stream, not a regional risk level

A named critical point: an intake, a bridge, a campsite

An arrival time and a confidence value

A target of up to an hour of lead time

Funded by an Innosuisse Start-up Innovation Project. Roughly twelve months out.

What we are solving next

Forecast skill in the tail

A model is easy to score on an average week. It has to hold on the day the catchment behaves unlike anything it has seen.

Calibration that travels

Extending the reference set so each new site needs fewer local samples before it produces defensible data.

Robustness at the peak

Measuring reliably when concentration and debris are highest, which is exactly when the reading matters.

Trust in the control room

A false-alarm rate low enough that a warning is acted on, and delivery into workflows operators already run.

In Misox the same water destroyed six power plants and a valley. One sensor network can warn both.