COUPLING REAL-TIME URBAN FLOOD FORECASTING WITH POLLUTION ASSESSMENT

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Content

- Objectives of the new system
- Methodology and model description
- Results of the analysis

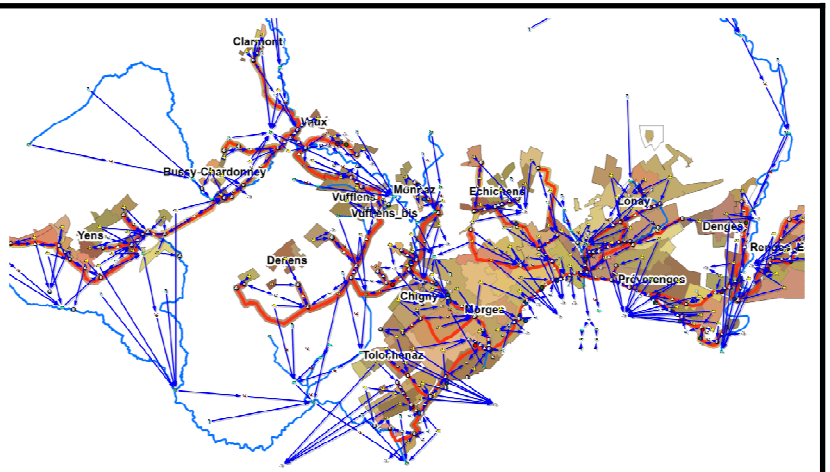
- Online real-time monitoring and forecasting system

Objectives of the new system

- **Morges - Switzerland : fast growing urban and peri-urban region into a high quality environment (35'000 EH)**
- **Main objective : adapt the existing wastewater and stormwater drainage system**

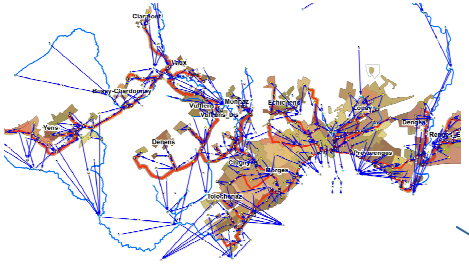
- ✓ **Increasing the knowledge and understanding of the existing sewer system**
- ✓ **Identify local hotspots**
- ✓ **Estimate the capacity reserve of the system**
- ✓ **Define a maintenance and adaptation strategy**

Methodology



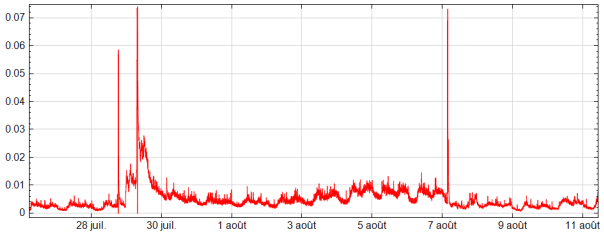
Methodology

MODELLING



- System diagnosis
- Definition of adaptation strategy
- Limited uncertainties

FIELD OBSERVATIONS



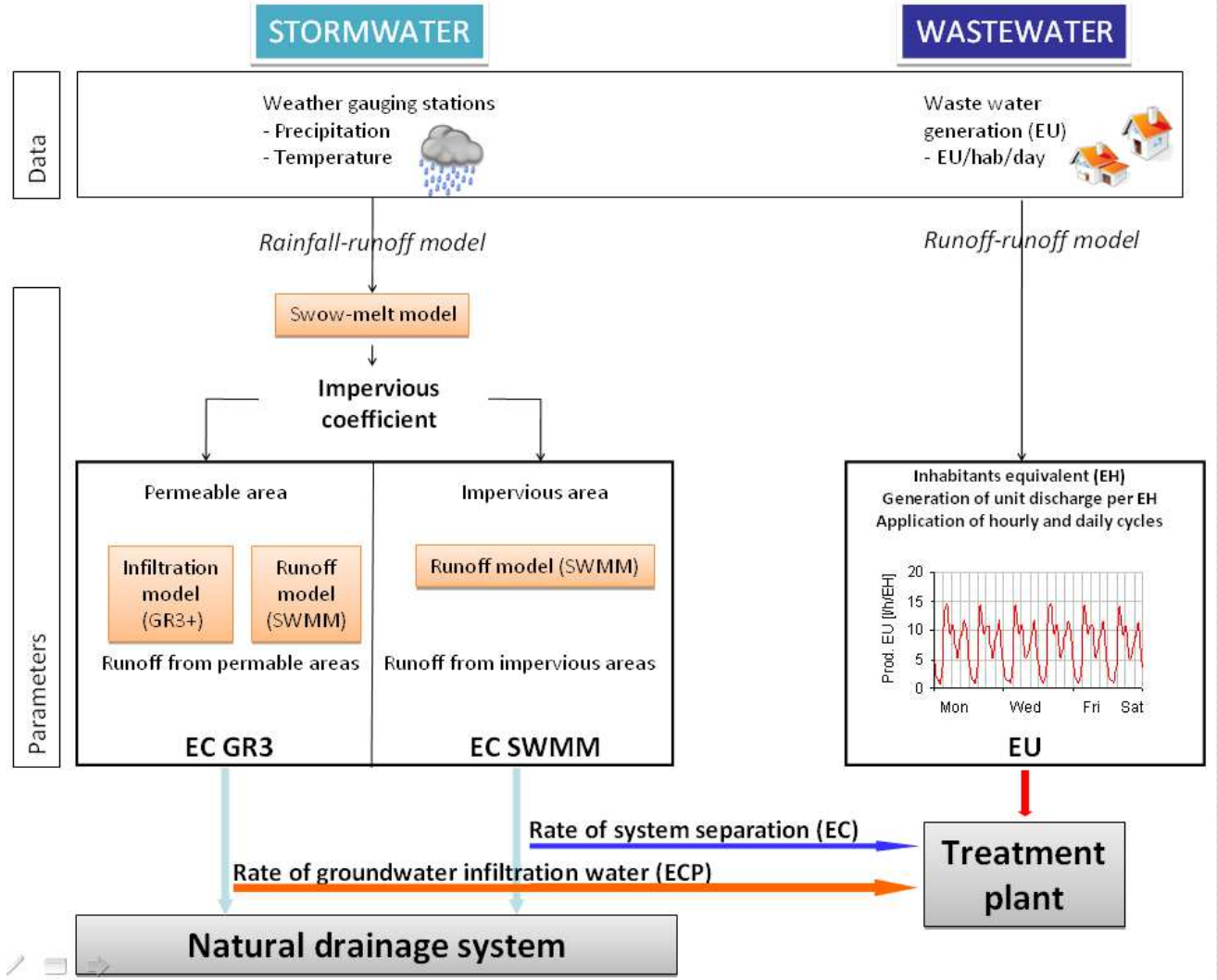
Update of the model into

REAL-TIME MONITORING AND FORECASTING

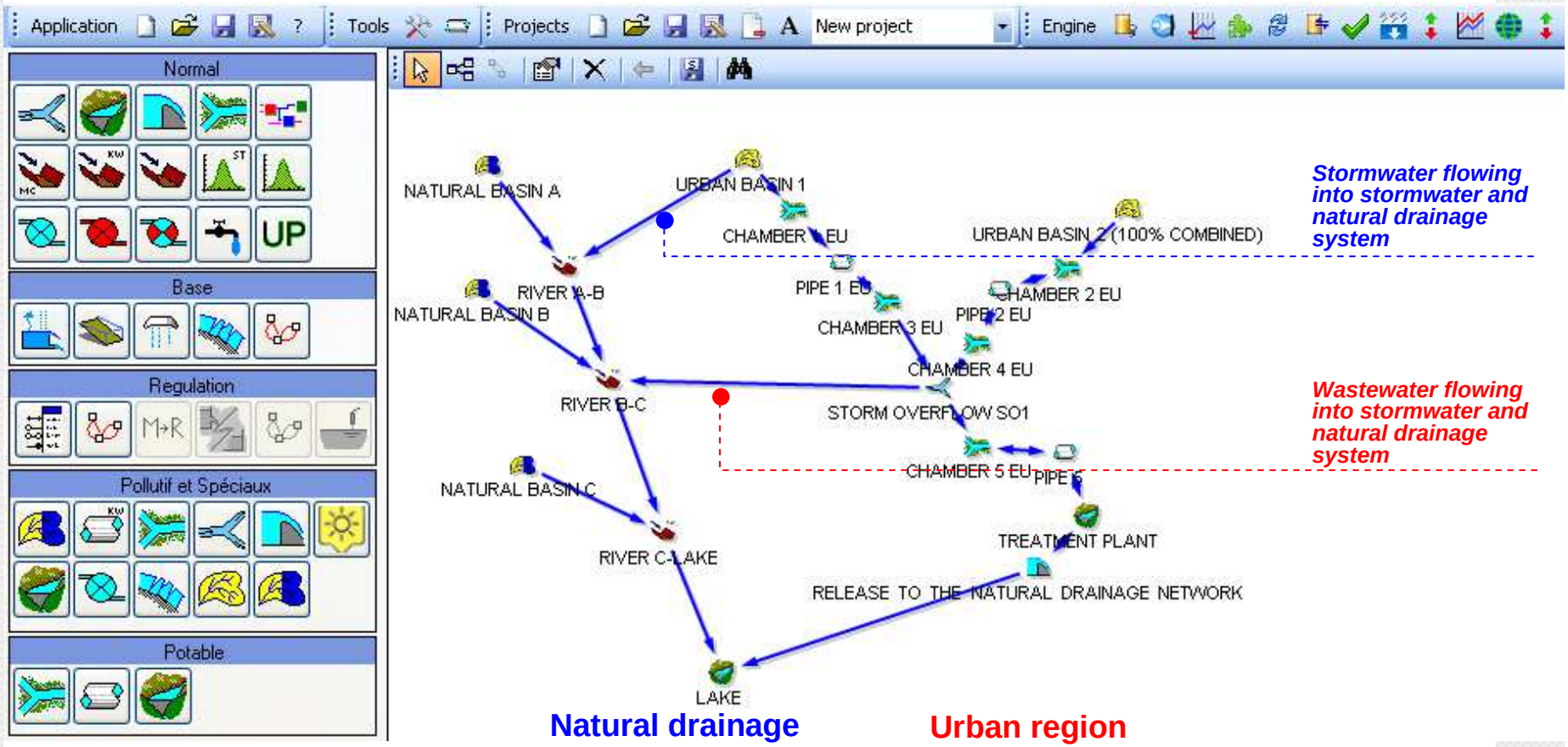
- Validation of the adaptation strategy
- Optimization of the measures
- Keep knowledge growing

Methodology

MODELLING CONCEPT



MODELLING TOOL - RS2012 City



Methodology

Input data

P, T, EU*

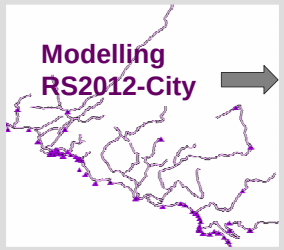
Control data

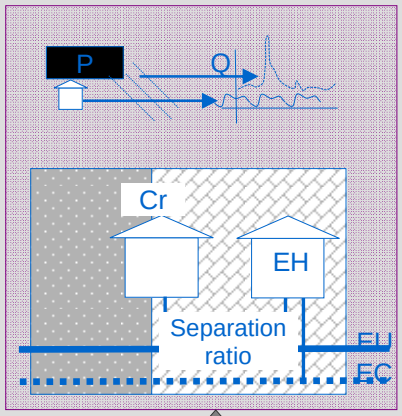
Q, pollution indices

Reference model

Parameters

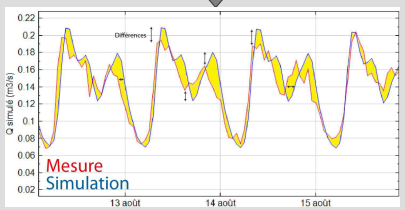
Parameters basins + pipe network





Model calibration

- Continuous simulation
- Field observations



Current state of the system

- Treatment plant
- Networks
- -Pumping stations and stormwater spillways

Scenarios of evolution

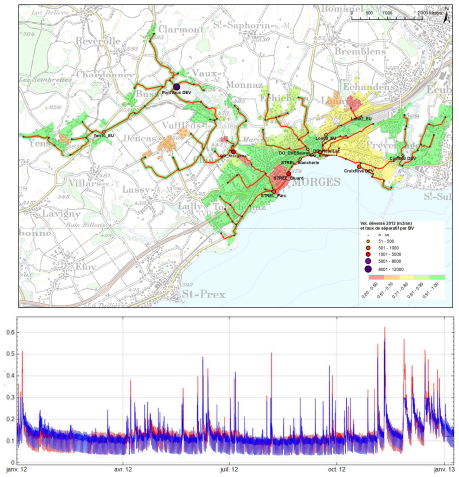
- Increase population
- Refactoring / extension networks

Analysis / diagnose

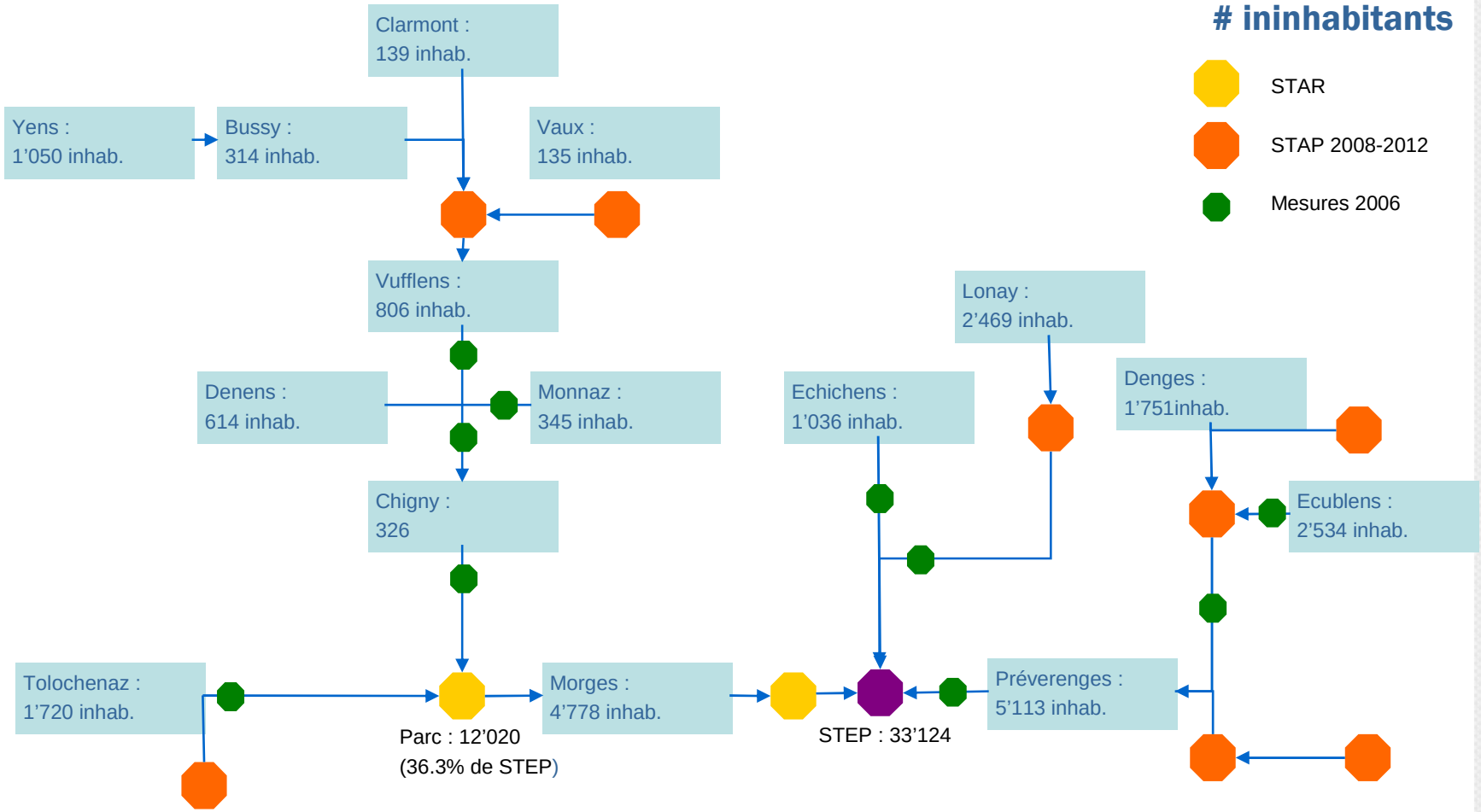
- **Capacity reserve of the pipe networks**
- **Capacity of treatment plants**
- **Environmental impact**
- **Local failures of the network**
- **Global hydraulic drainage efficiency**
- **Global environmental efficiency**

DATA → **SIMULATION MODEL** → **SCENARIOS** → **INDICATORS**

Results


Clarmont
St-Saphorin
Bremblens
Echandens
Monnaz
Vaux-s-M.
Chavannes
Denens
Villars
Lussy-s-M.
MORGES
St-Sul
St-Prex
Eby
0.6
0.5
0.4
0.3
0.2
0.1
0
janv. 12
avr. 12
juil. 12
oct. 12
janv. 13

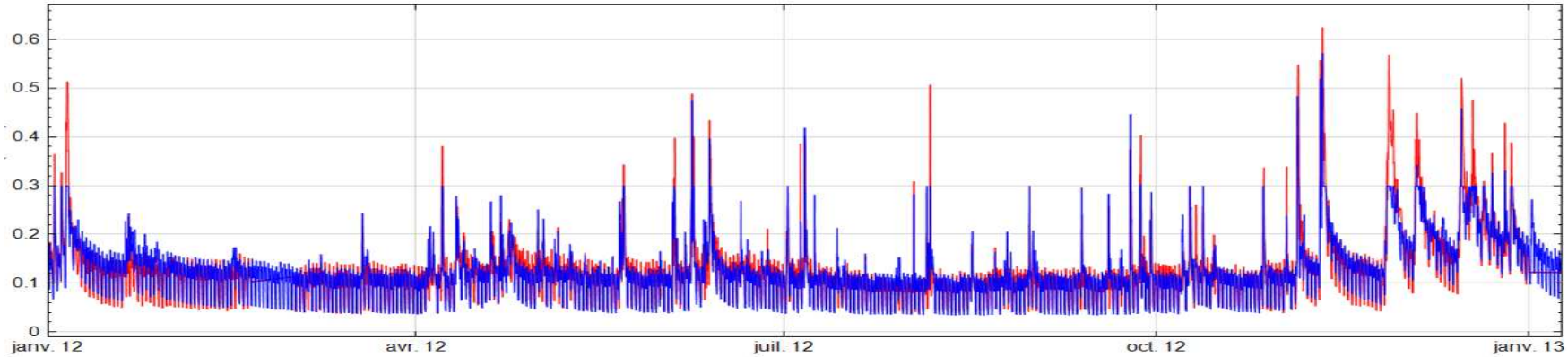
Global calibration – Local validation



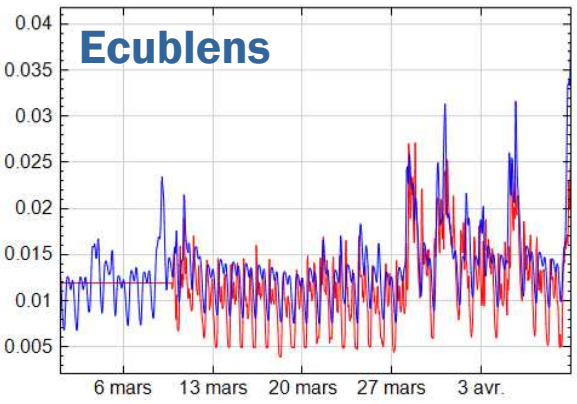
Global calibration – Treatment plant

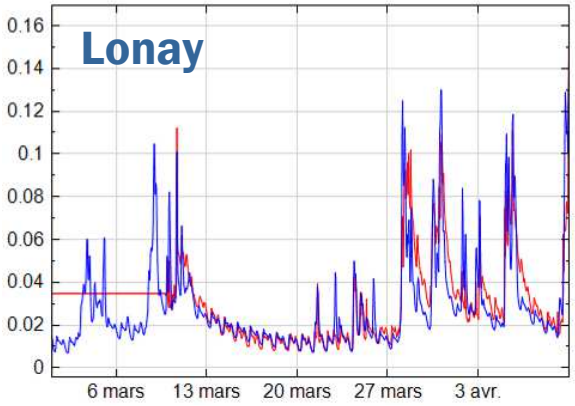
Discharge in m^3/s

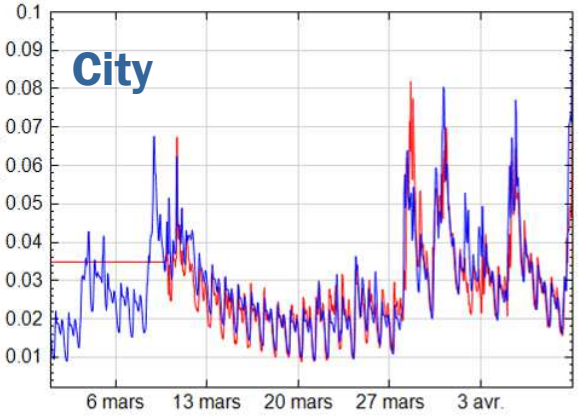
Simulation Observation



Local validation – field campaigns

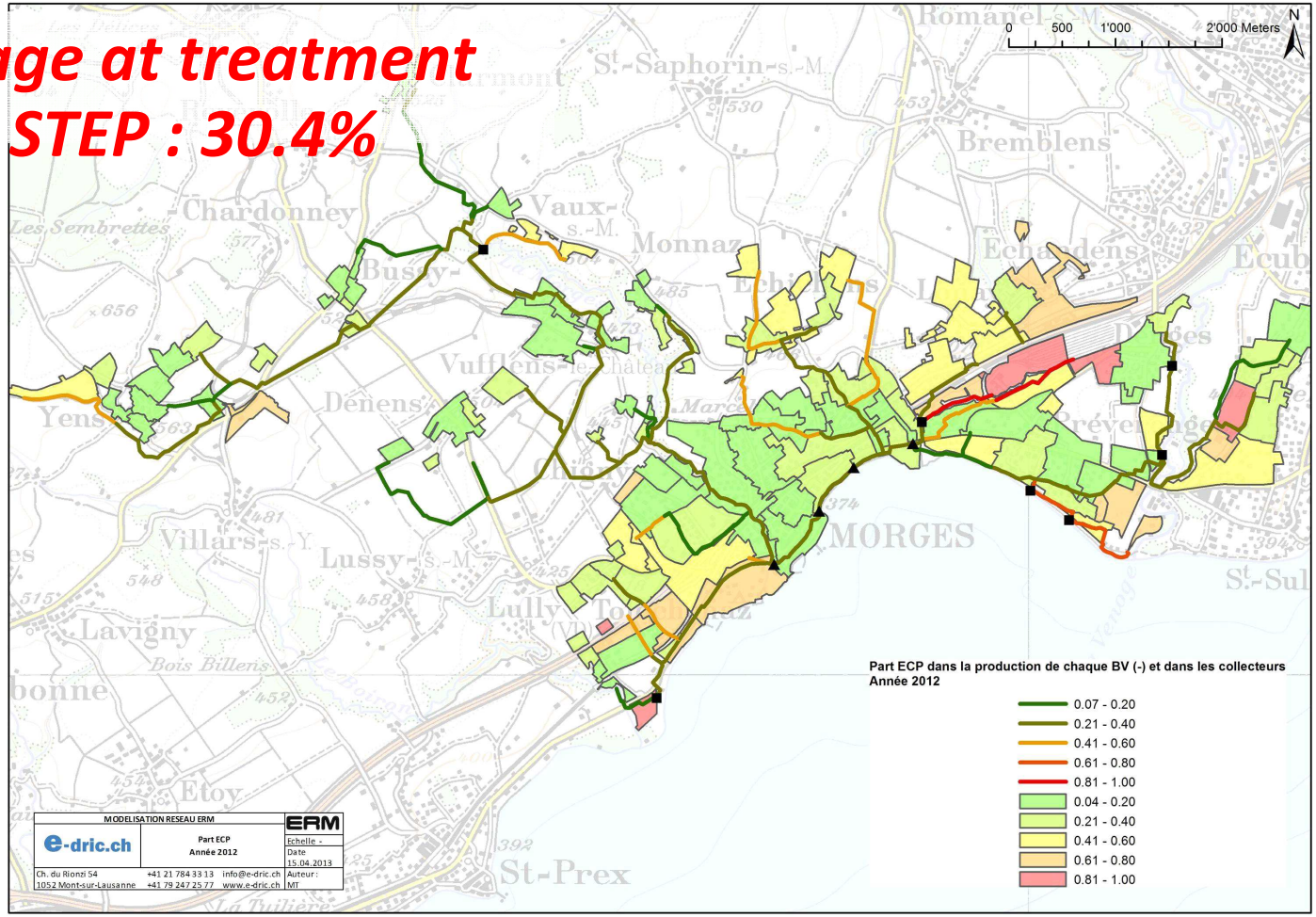




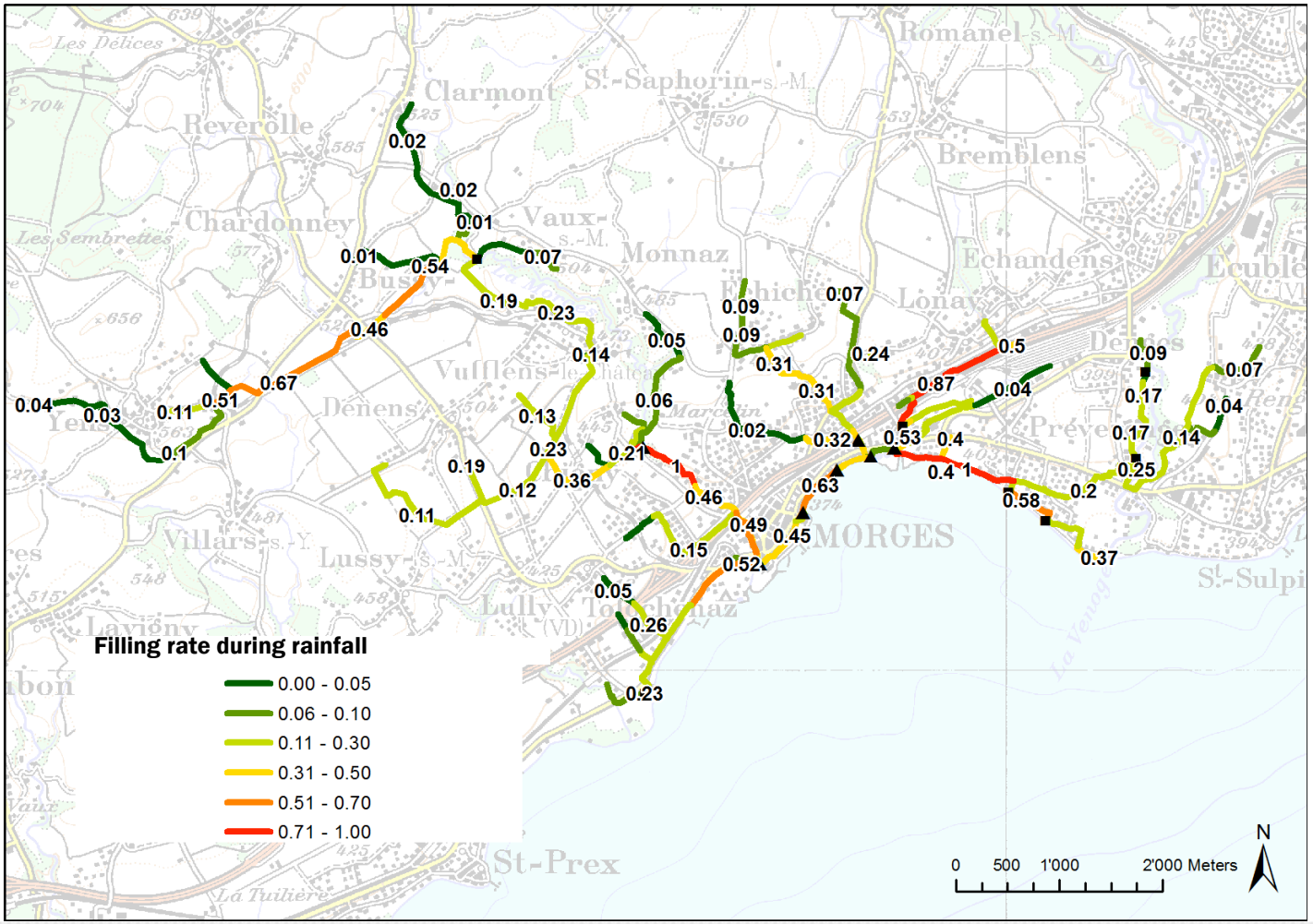


Groundwater infiltration

Average at treatment plant STEP : 30.4%



Filling rate of pipe network (rainfall event)

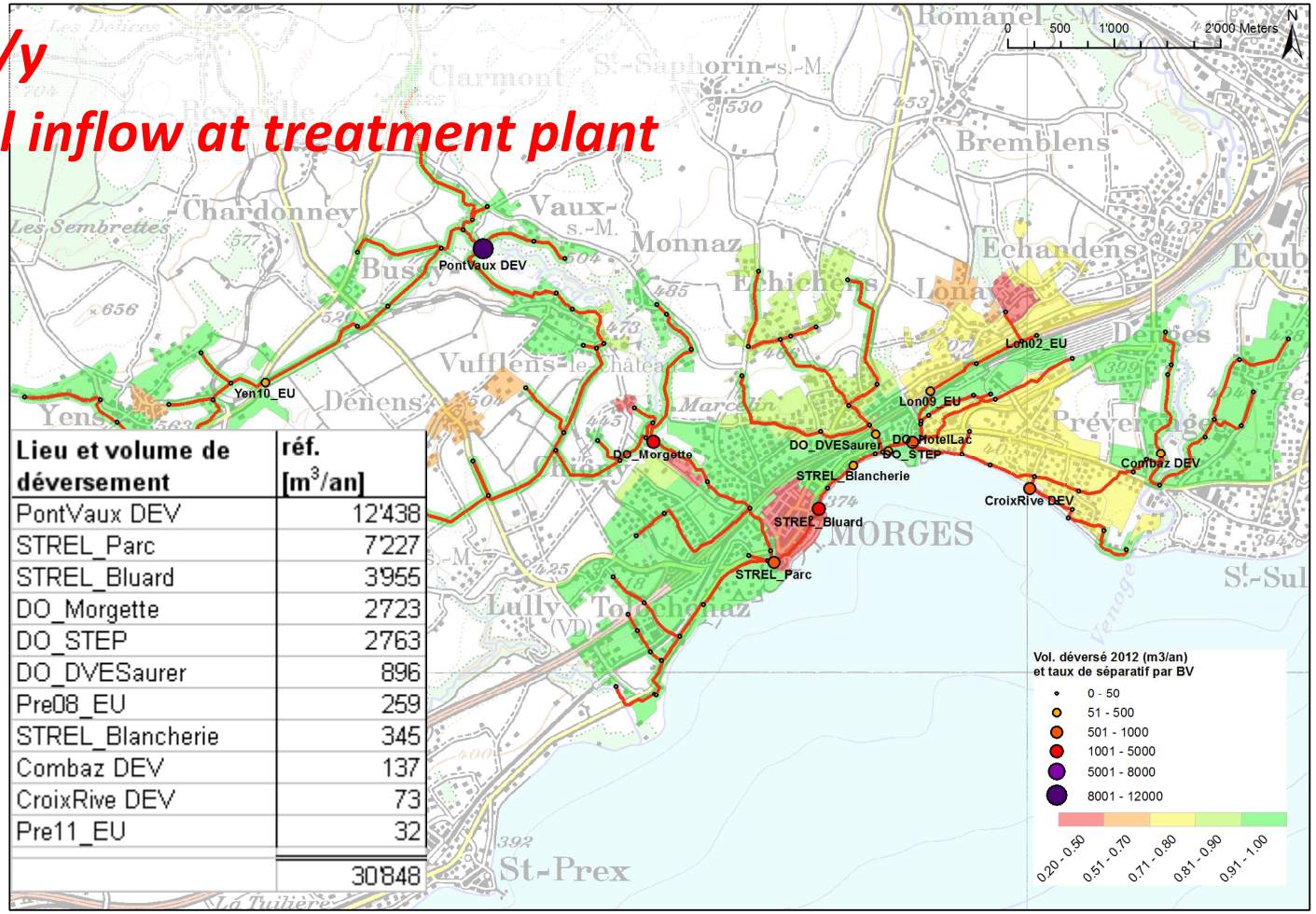


Spilled wastewater

31'000 m³/y

1% of total inflow at treatment plant

Lieu et volume de déversement	réf. [m³/an]
PontVaux DEV	12'438
STREL_Parc	7'227
STREL_Bluard	3'955
DO_Morgette	2723
DO_STEP	2763
DO_DVESaurer	896
Pre08_EU	259
STREL_Blancherie	345
Combaz DEV	137
CroixRive DEV	73
Pre11_EU	32
	30'848



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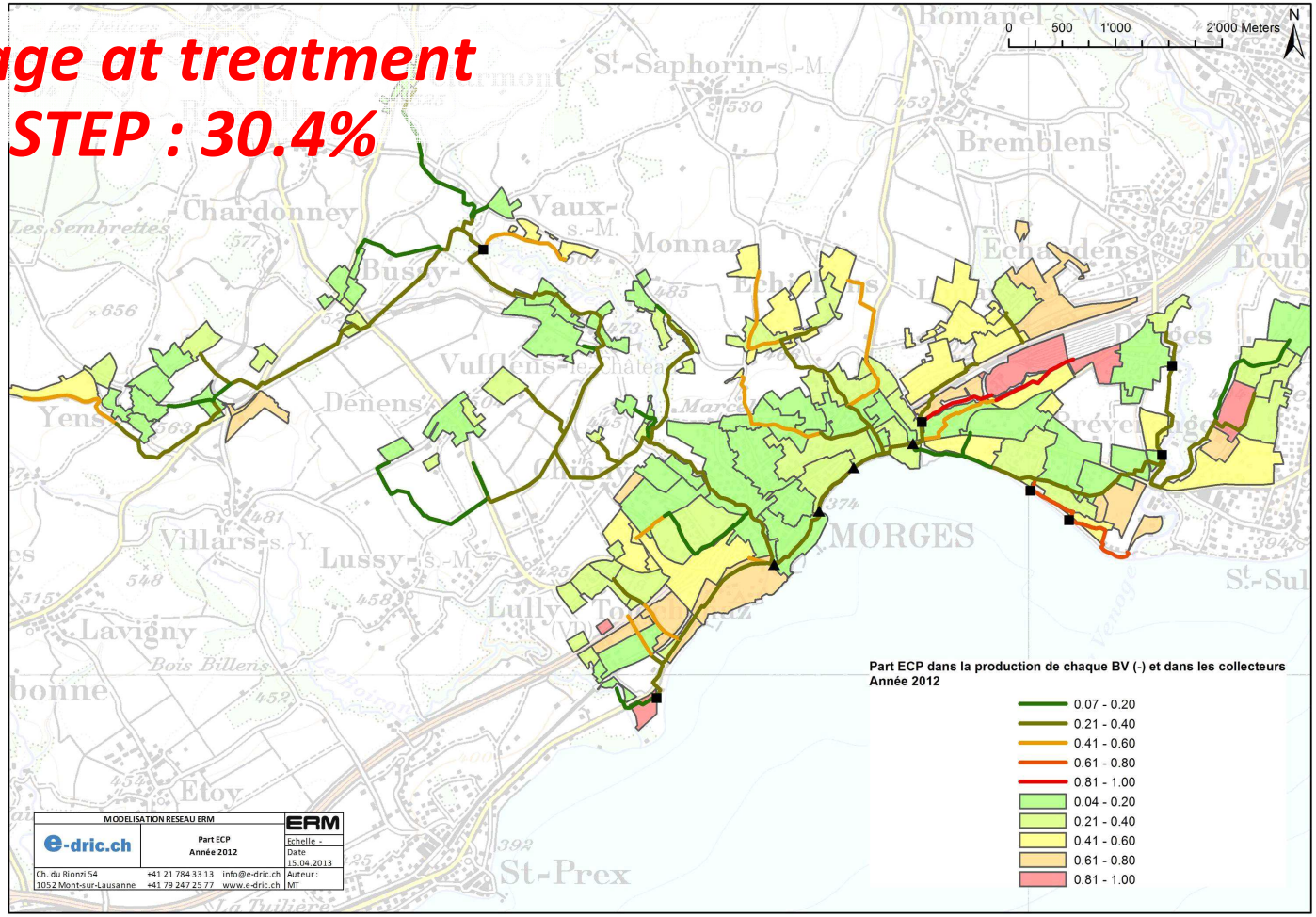
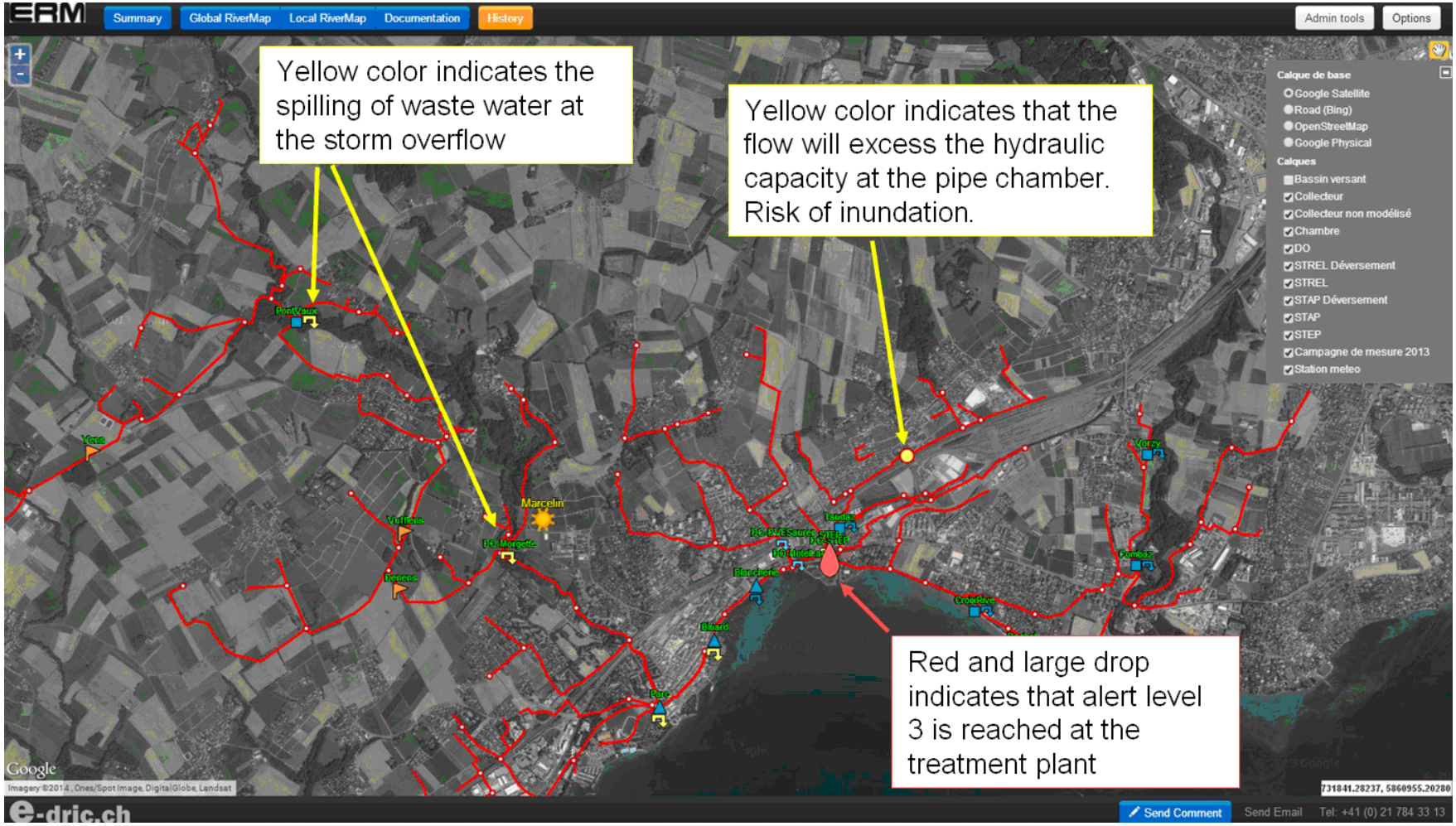


Online platform

Example of situation



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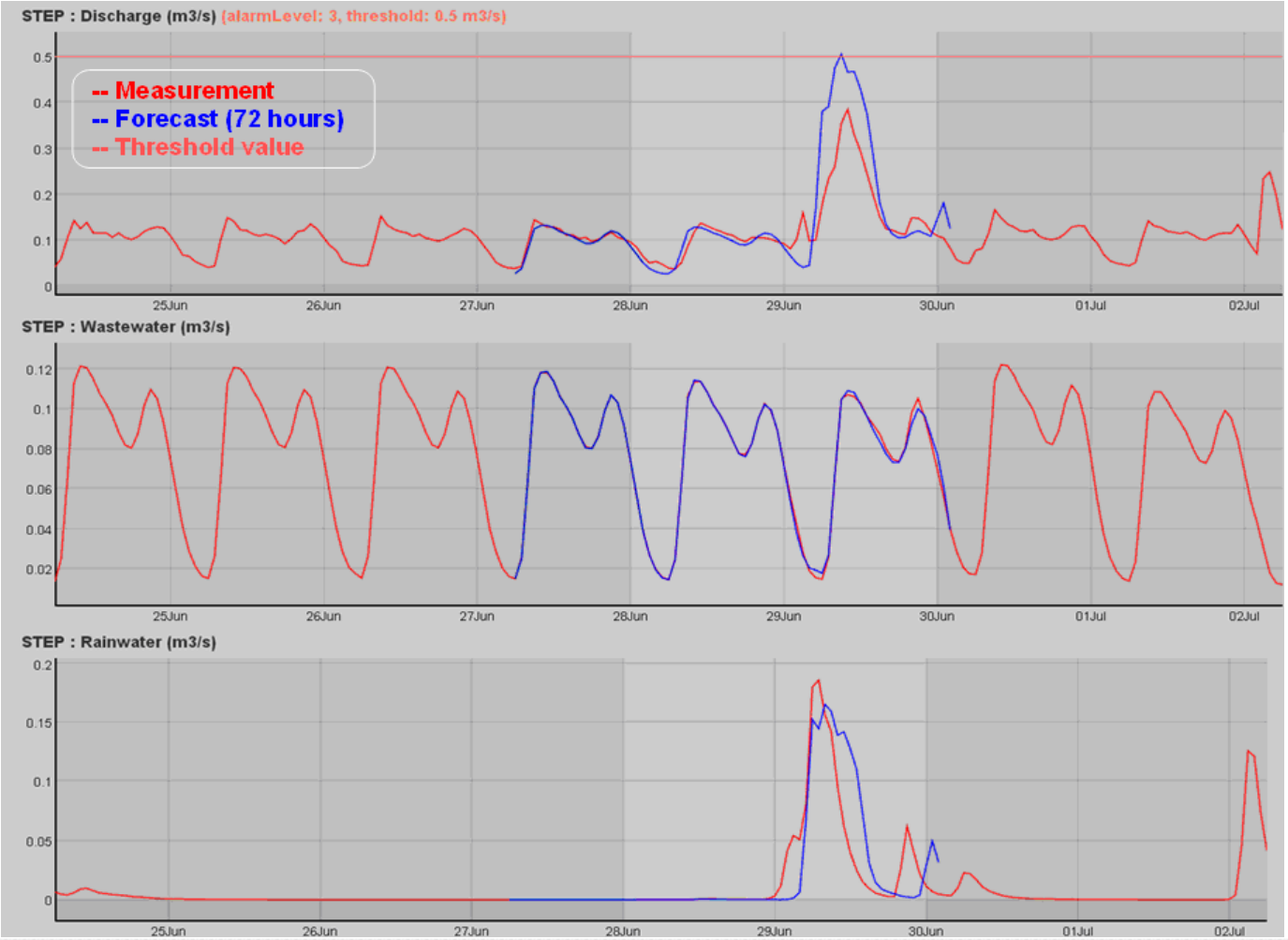

Online platform

- ❖ Predict flood events in the **wastewater** as well as in the **stormwater** drainage systems
- ❖ Predict **inflows at the treatment plant** : optimization of energy consumption and maximization of treatment efficiency

- ✓ **Efficiency control** of the adaptation measures
- ✓ Regular increase of the **knowledge** of the system by a daily analysis of the model – reality of the basin
- ✓ Planning of **field campaigns** and **construction works** on the infrastructure

Thank you for your attention