Team 01 Presentation 3

Presentation 3: Results of 2nd Week

HYDROEUROPE

Group Members: Alejandra, Arnau, Emilie, Floria, Guilhem, Humbeline, Maryam, Matthew, Issa

Supervisor: Gonzalo

Co-funded by the European Union

UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH
UPC

VUB VRIJE UNIVERSITEIT BRUSSEL
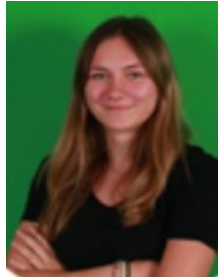
WARSAW UNIVERSITY OF TECHNOLOGY

Newcastle University

b-tu Brandenburgische Technische Universität Cottbus - Senftenberg

UNIVERSITÉ CÔTE D'AZUR

Summary

Overview of the methodology

HydroEurope Team#1

- UNCERTAINTIES IN ADVANCED HYDROLOGICAL
  - Observed Data Analysis
  - Simulated Data Analysis (sensitivity analysis & calibration)

  HEC - HMS

- HYDRAULIC MODELLING
  - IBER - Observed Data
  - TELEMAC - Simulated Data (HEC–HMS)

  Iber

  telemac

- ACCIDENTAL WATER POLLUTION
  - Pollutant Maps
  - Concentration Analysis
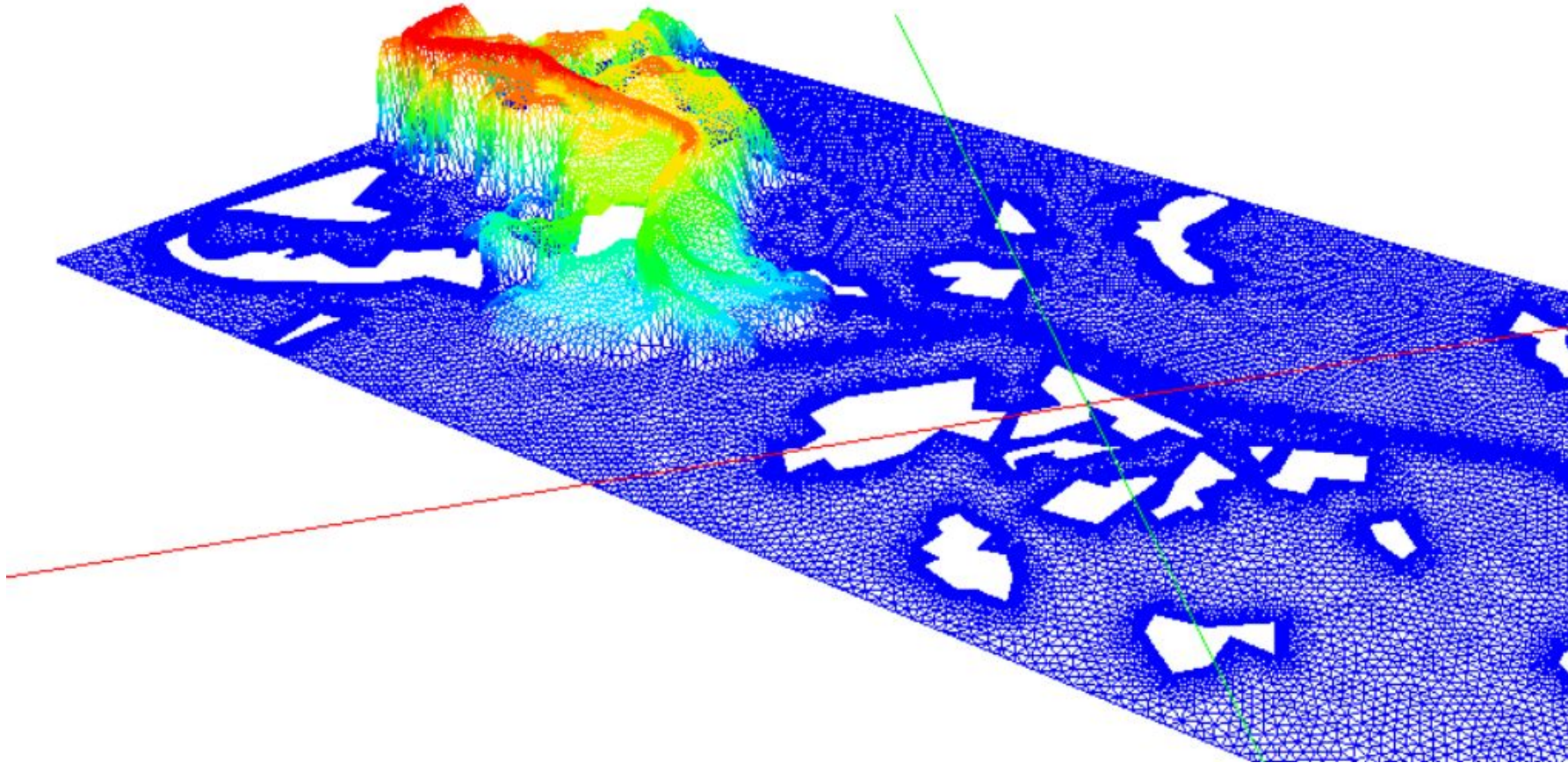
Special interest on Telemac

Remembering last week :

- Problem with the coefficient

- Simulate discharge

- Add the sea

Special interest on Telemac

Change elevation of the Mesh (culverts)

⇒ **Realistic model**

Input hydrographs - Simulated / Observed

Telemac -> Simulated

Iber -> Observed

Flood maps

Simulated Data

TELEMAC - Flood map US

TELEMAC - Flood map US

5.197427

0

0   1   2 km

Co-funded by
the European Union

UNIVERSITAT POLITÈCNICA
DE CATALUNYA
UPC   BARCELONATECH

VUB   VRIJE
UNIVERSITEIT
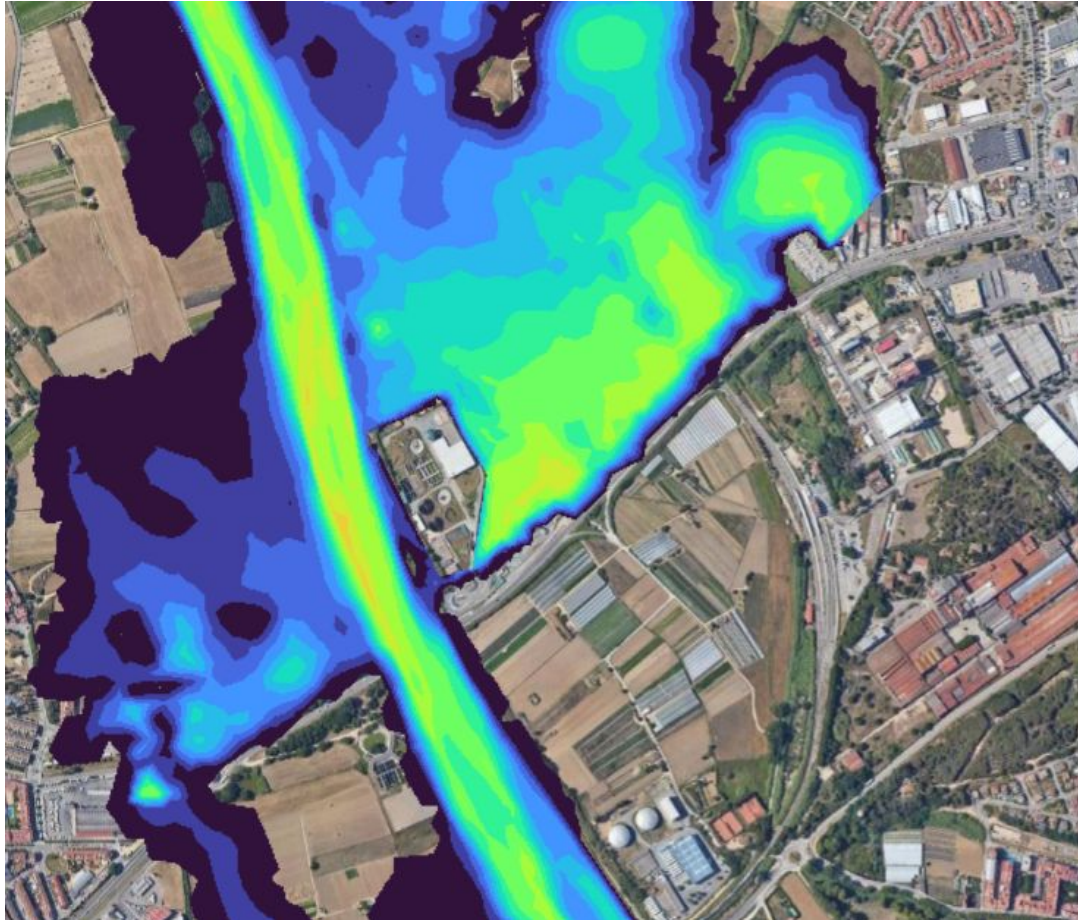BRUSSEL

WARSAW UNIVERSITY
OF TECHNOLOGY

Newcastle
University

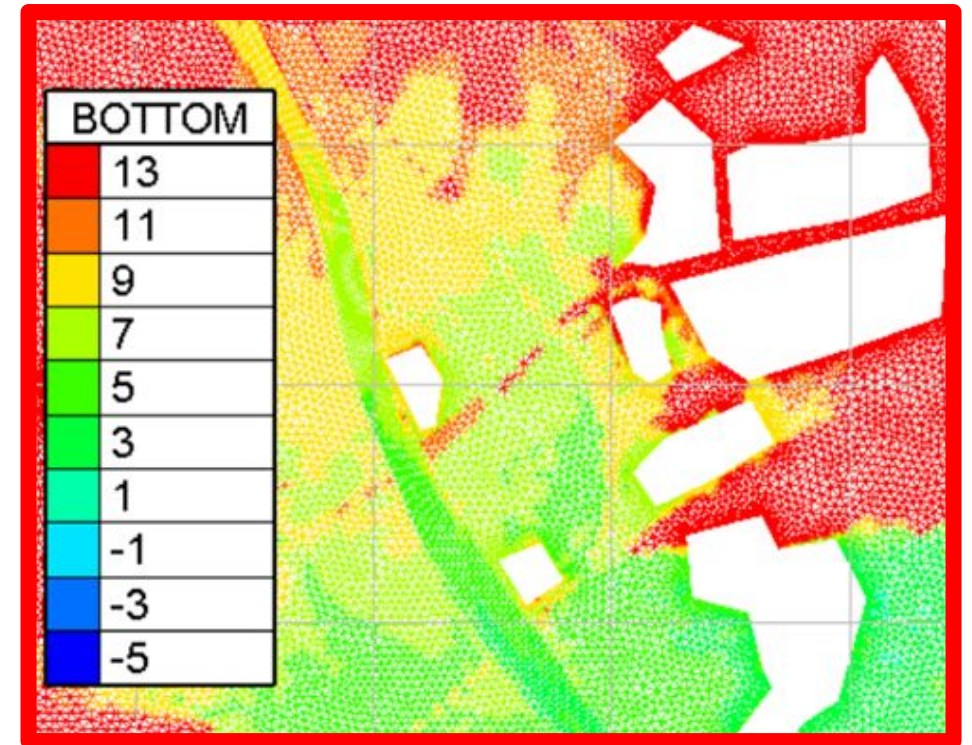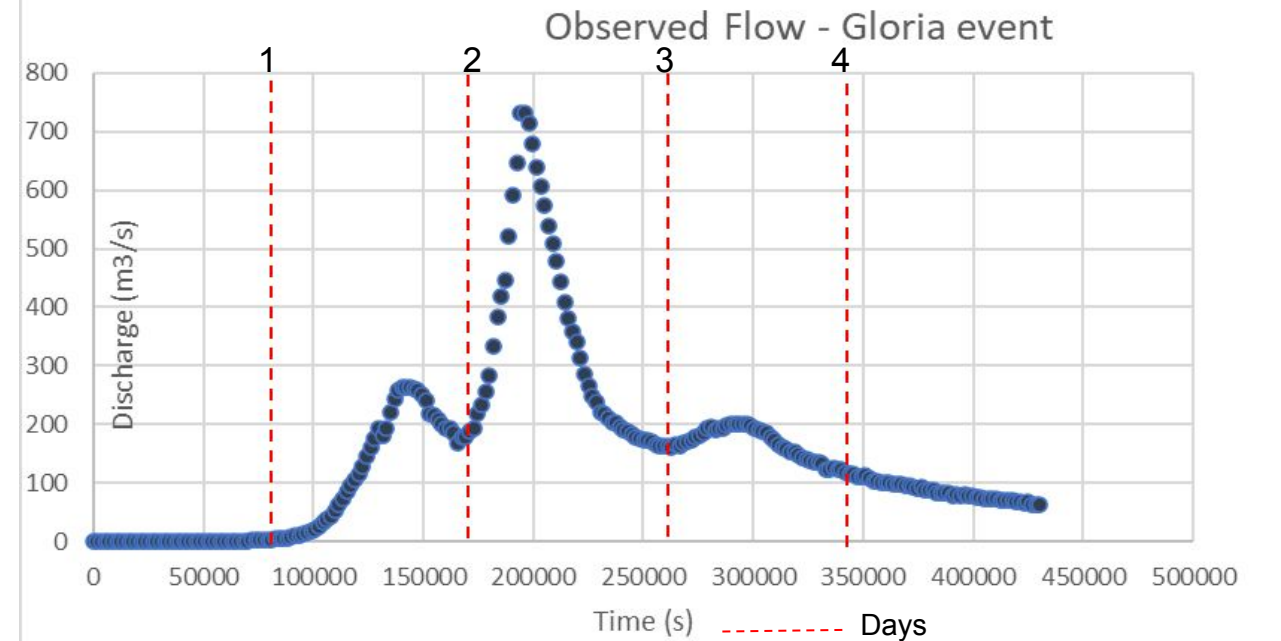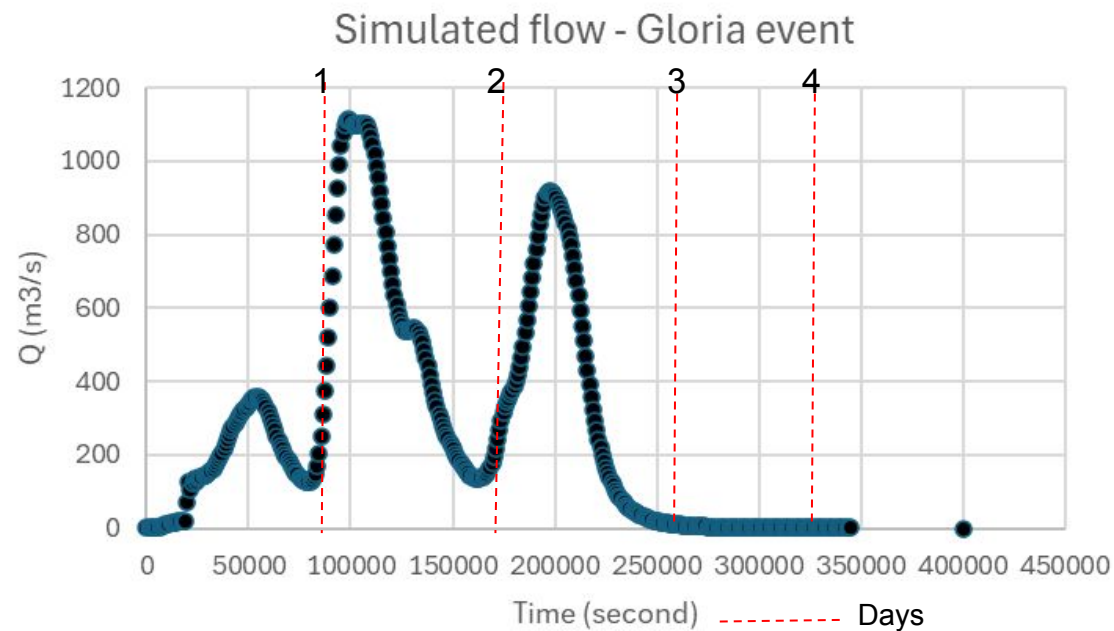b-tu   Brandenburgische
Technische Universität
Cottbus - Senftenberg

UNIVERSITÉ
CÔTE D'AZUR

Total Area: 23292 m2

0 25 50 m

Zoom Iber

0 25 50 m
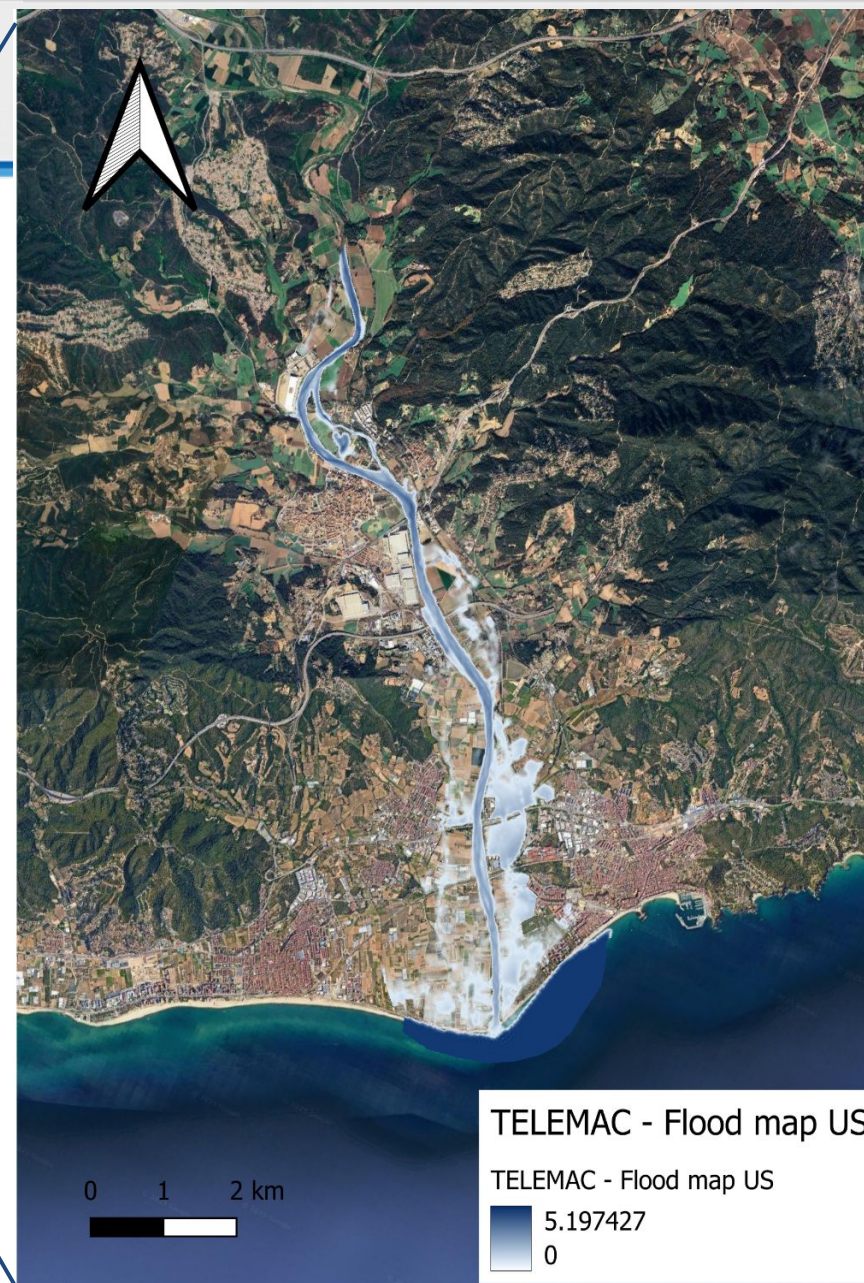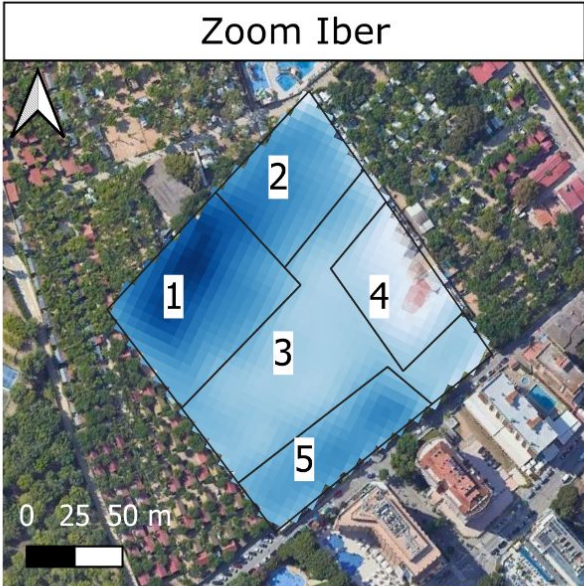
ZOOM IBER

ID	Depht (m)	Area (m2)	Volume (m3)
1	0.98	5501	5390.98
2	0.75	3338	2503.5
3	0.46	8392	3860.32
4	0.21	2953	620.13
5	0.68	3108	2113.44
TOTAL		23292	14488.37

Zoom Telemac

0 25 50 m
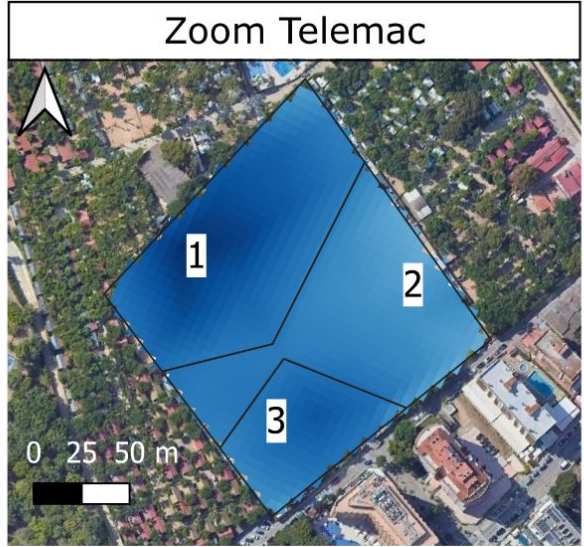
ZOOM TELEMAC

ID	Depht (m)	Area (m2)	Volume (m3)
1	1.23	10510	12927.3
2	0.83	4054	3364.82
3	1.08	8728	9426.24
TOTAL		23292	25718.36

Pollution scenarios - General information

Where ?

Pollution Source at a wastewater treatment plant

Pollutant source

Legend
* Pollutant source
— River Tordera

Pollution scenarios - General information

Which pollutant?

❖ **CBOD** ———————— **Carbonaceous biochemical oxygen demand**

❖ **DO** ———————— **Dissolved oxygen**

❖ **Nitrogen condition:**

➢ **N-NHO3**

➢ **N-NO3**

❖ **Coliform (IBER only)**

# Pollution scenarios - General information

Pollutant	Impact	Levels (kg/m3)	
		Pre incident	During incident
Dissolved Oxygen (DO)	Indicates the rivers ability to support aquatic life.	0.0083	0.0083
Carbonaceous Biochemical Oxygen Demand (CBOD))	Measures the oxygen present for microbial decomposition of organic matter.	0.002	0.08
Ammonia (NH3)	Contributes to eutrophication and excessive algal growth.	0.0002	0.015
Nitrate (NO3)		0.0005	0.0005

characteristics

Flow rate

Q: 0.328 m3/s

La Tordera Catchment
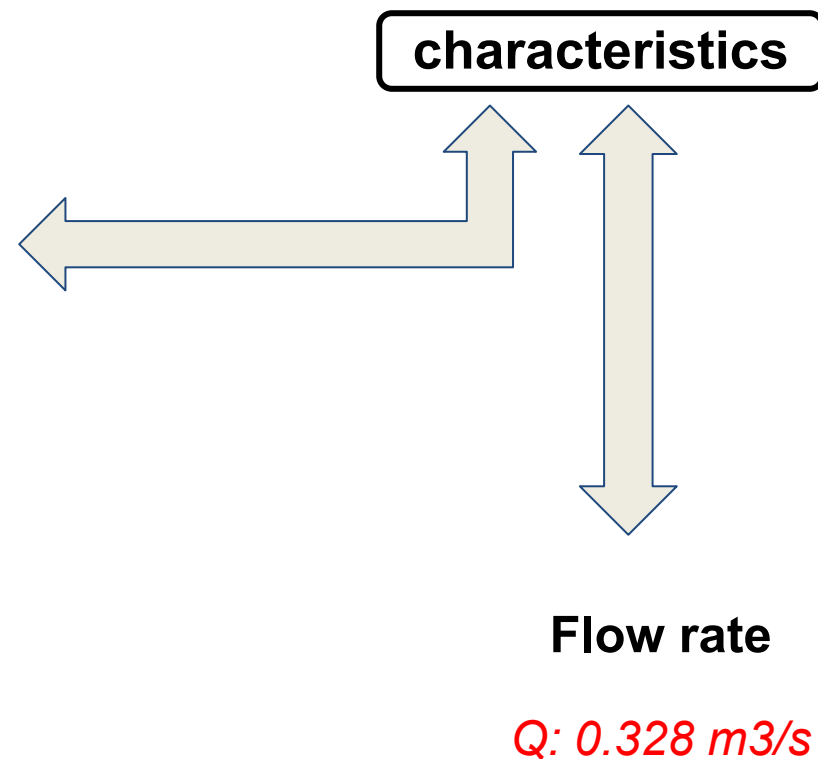
Special interest on Iber

Due to lack of time, amount of uncertainty and being it a hypothetical scenario some optimizations were made.

Assumed scenario:

- Coarser mesh

- Discharge point near WWTP

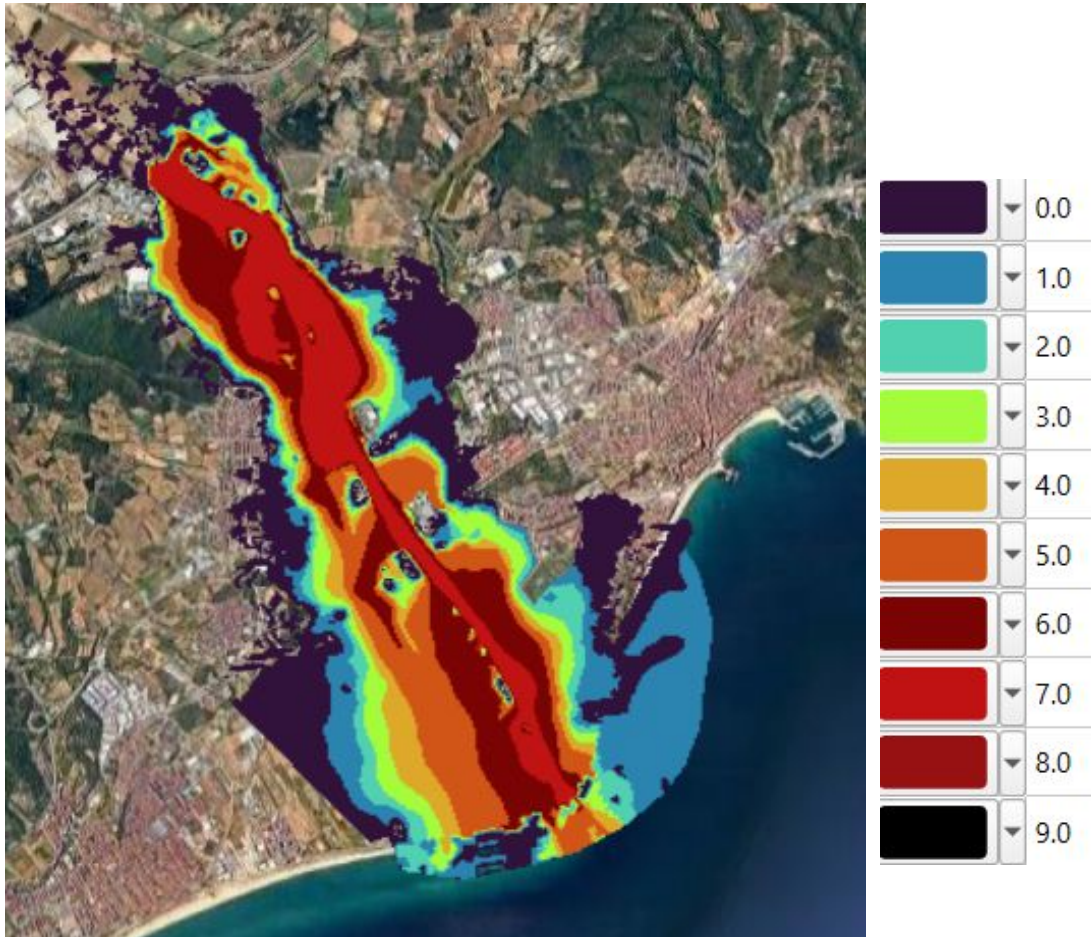- Hypothetical water quality data
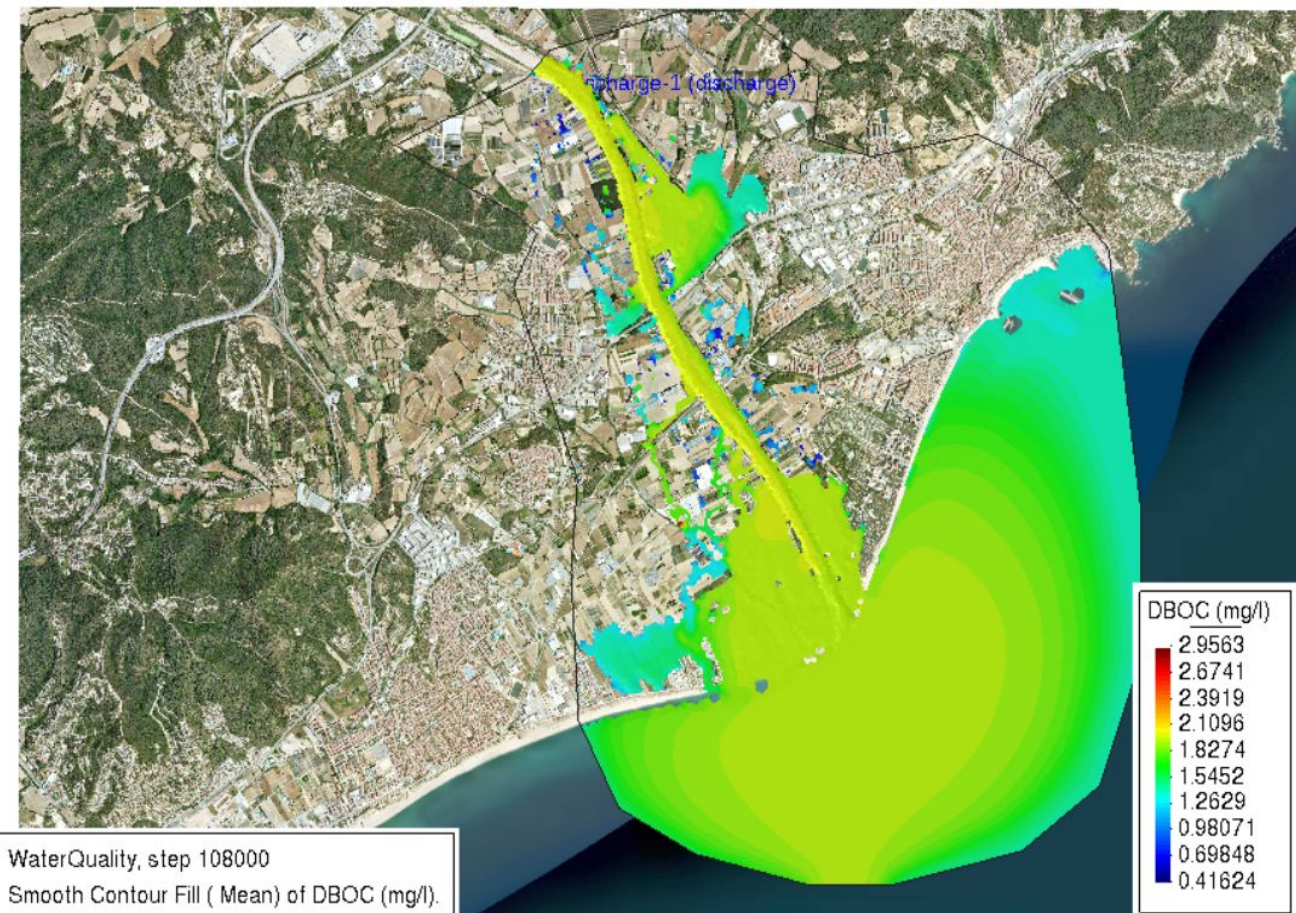
- Different hydrograph

(peak discharge 500 m3/s)

Pollution maps - CBOD

Simulated

Observed

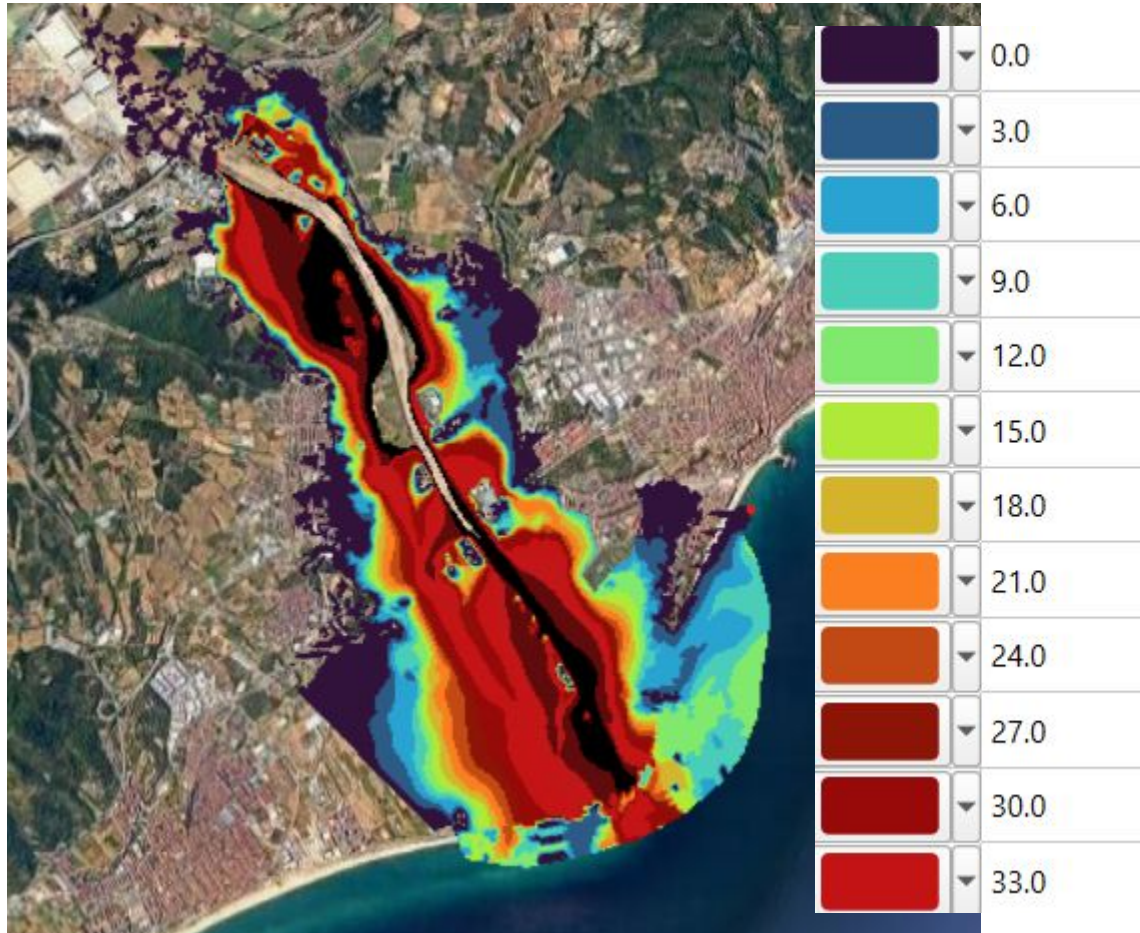# Pollution maps - DO

Simulated
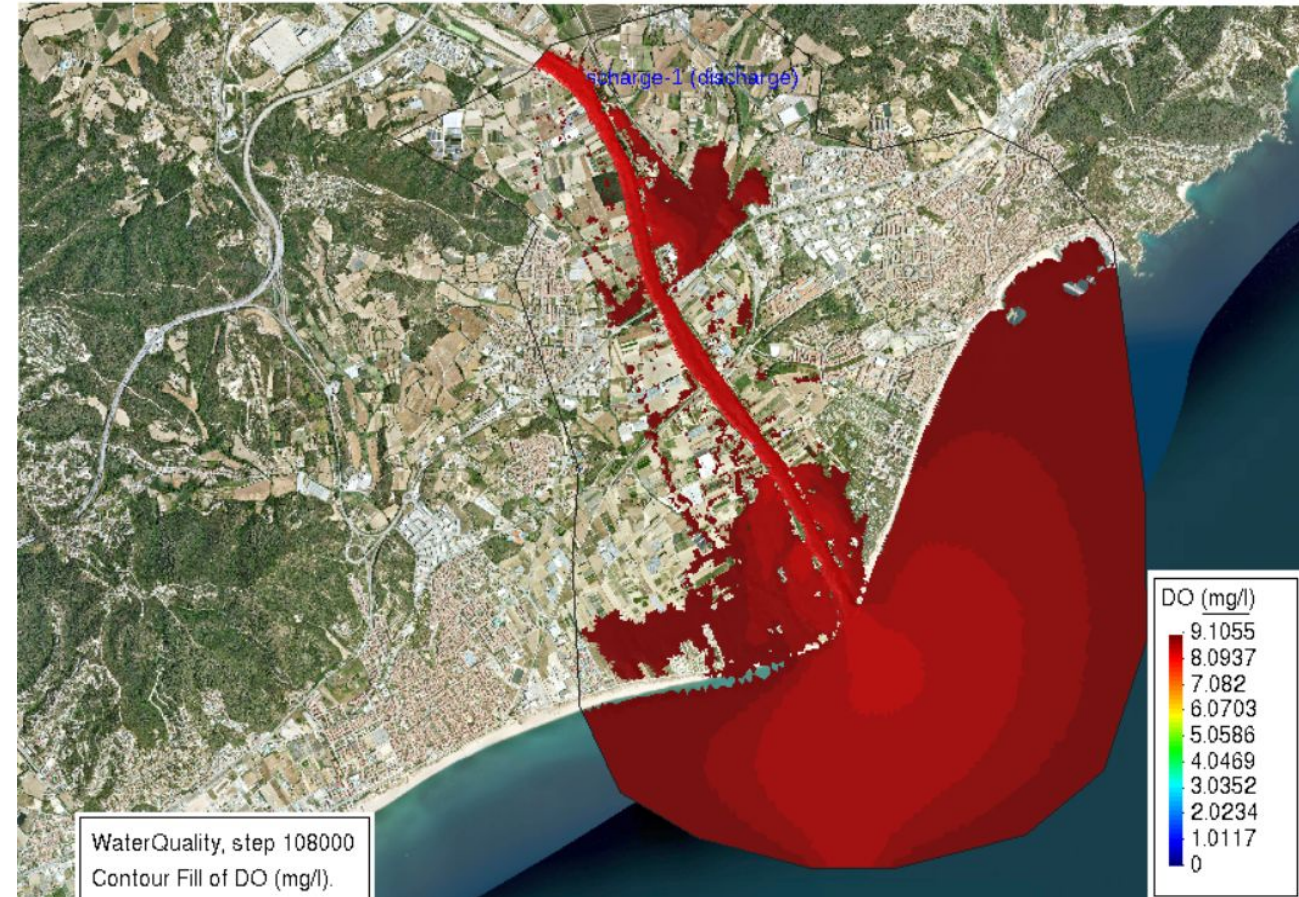
Observed

Pollution maps - N-NH3

Simulated
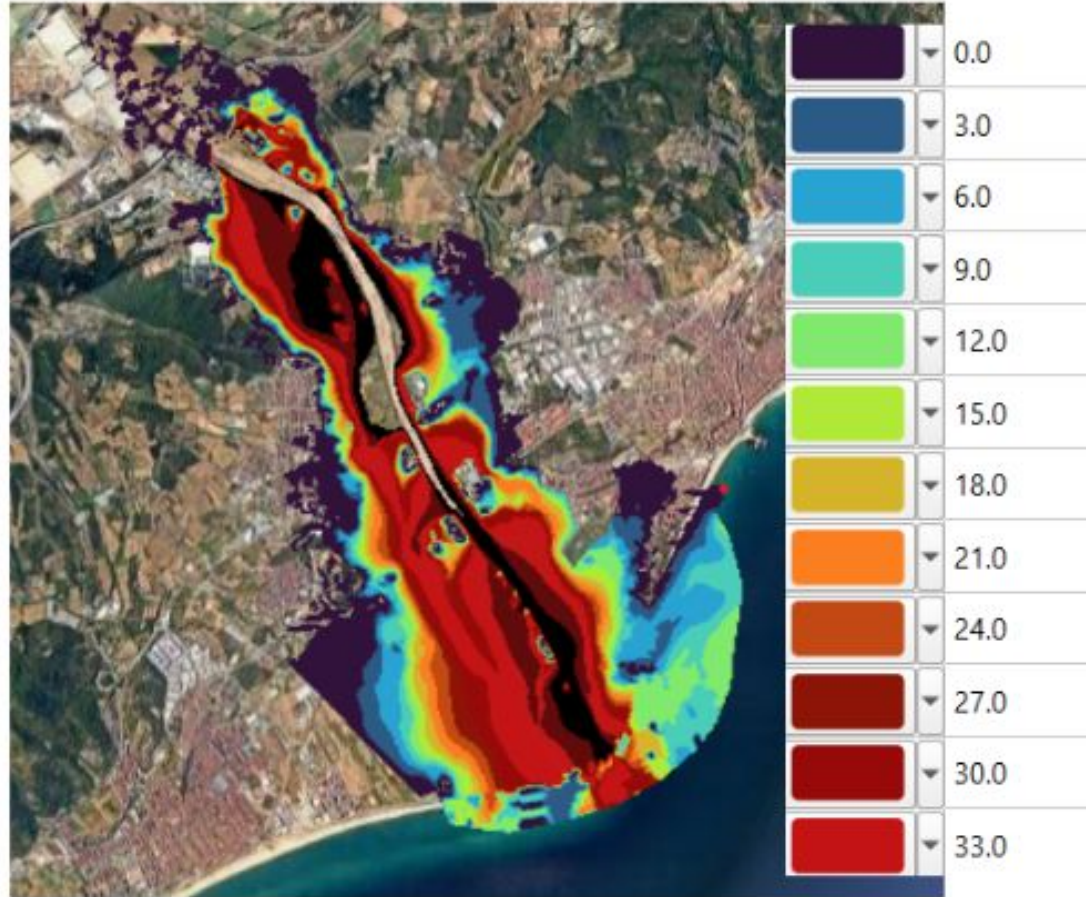
Observed
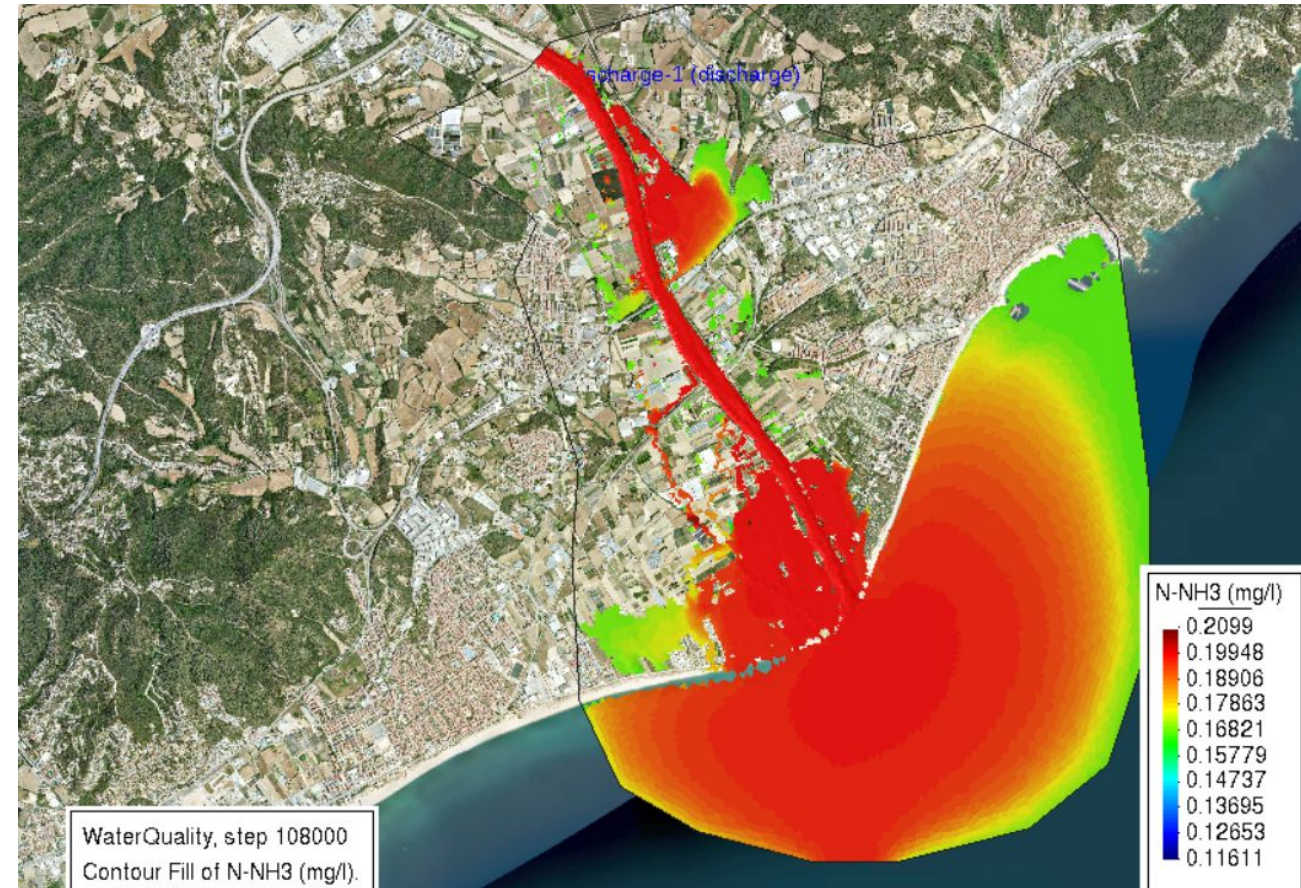
Pollution maps - N-NO3

Simulated
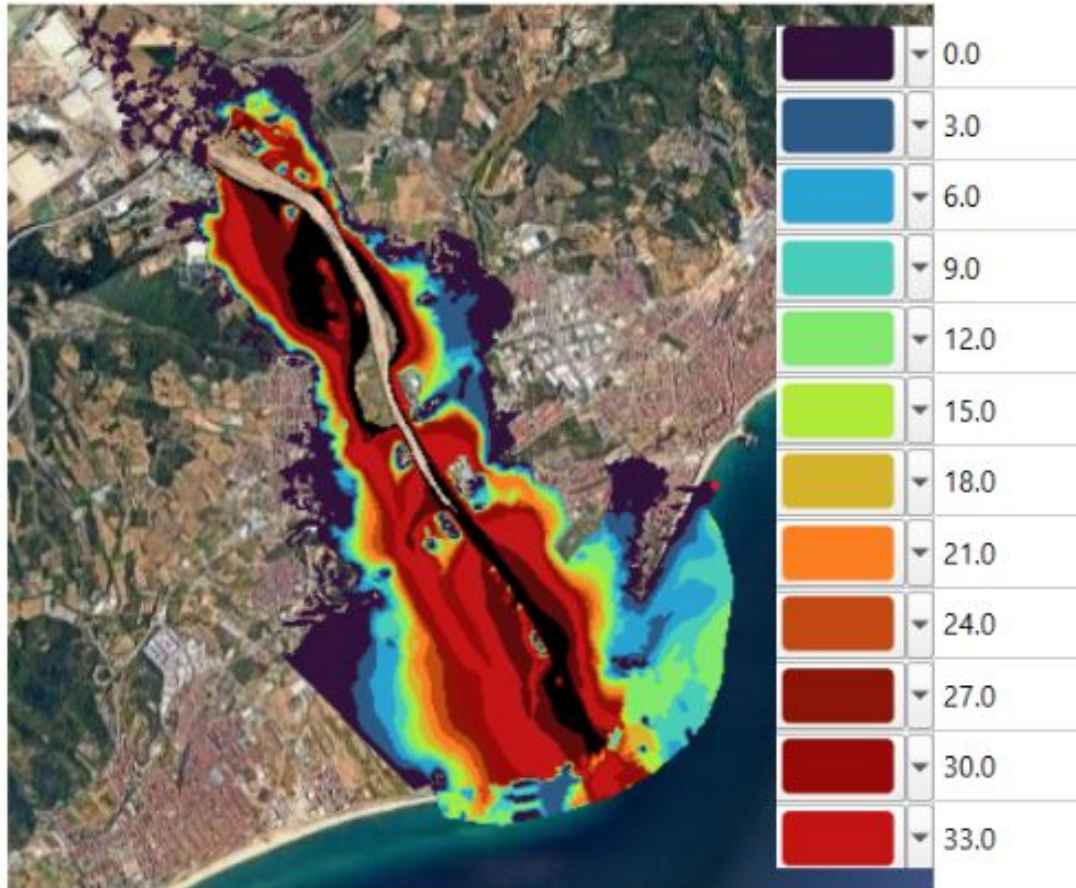
Observed
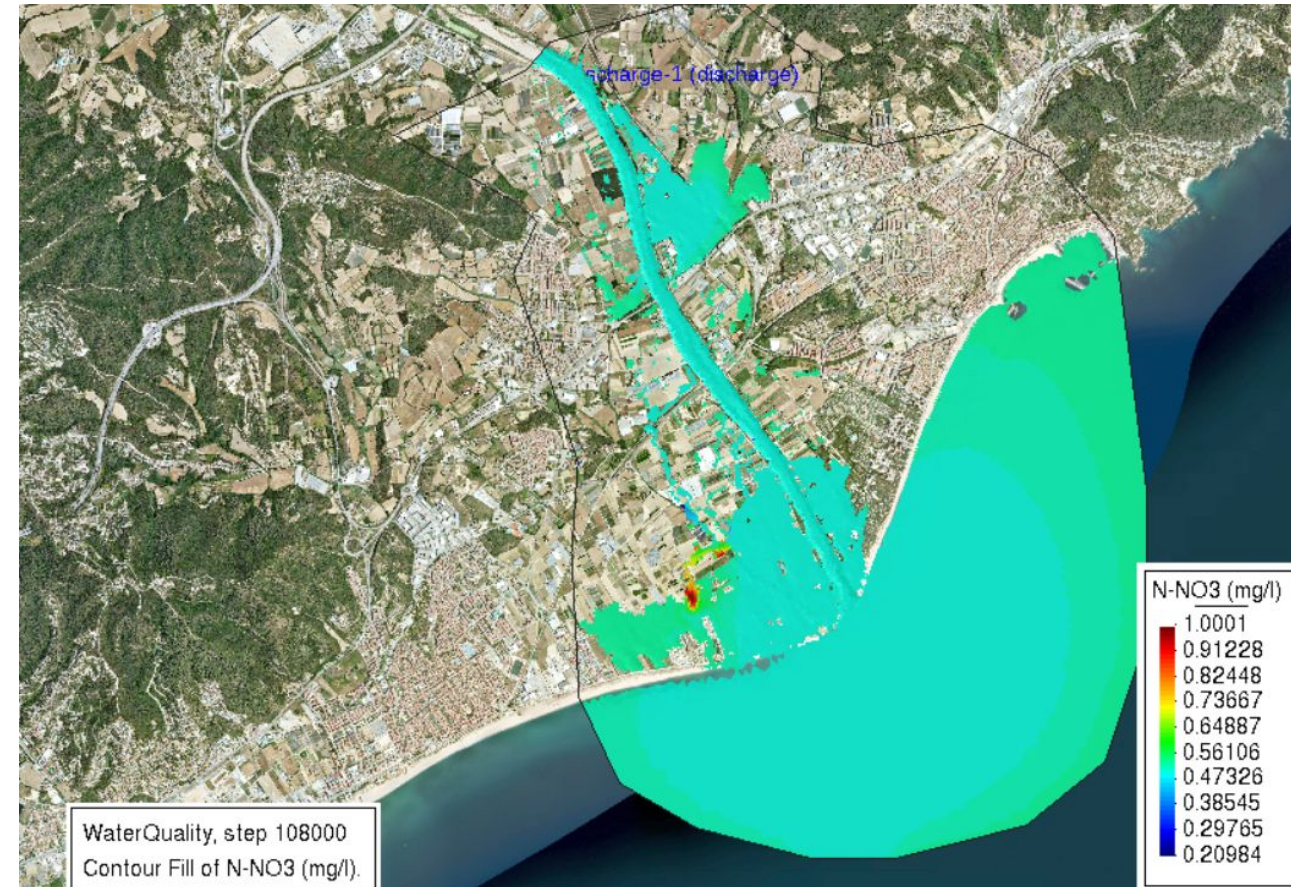
La Tordera Catchment

P1	479513 4614800 0	Near discharge
P2	480153 4613200 0	Mid river
P3	480836 4611690 0	Flooded area
P4	481575 4610840 0	Sea

Point 1; d= 840 m
Point 2; d=2590 m
Point 3; d=2590 m
Point 4; d=5350 m
WWP
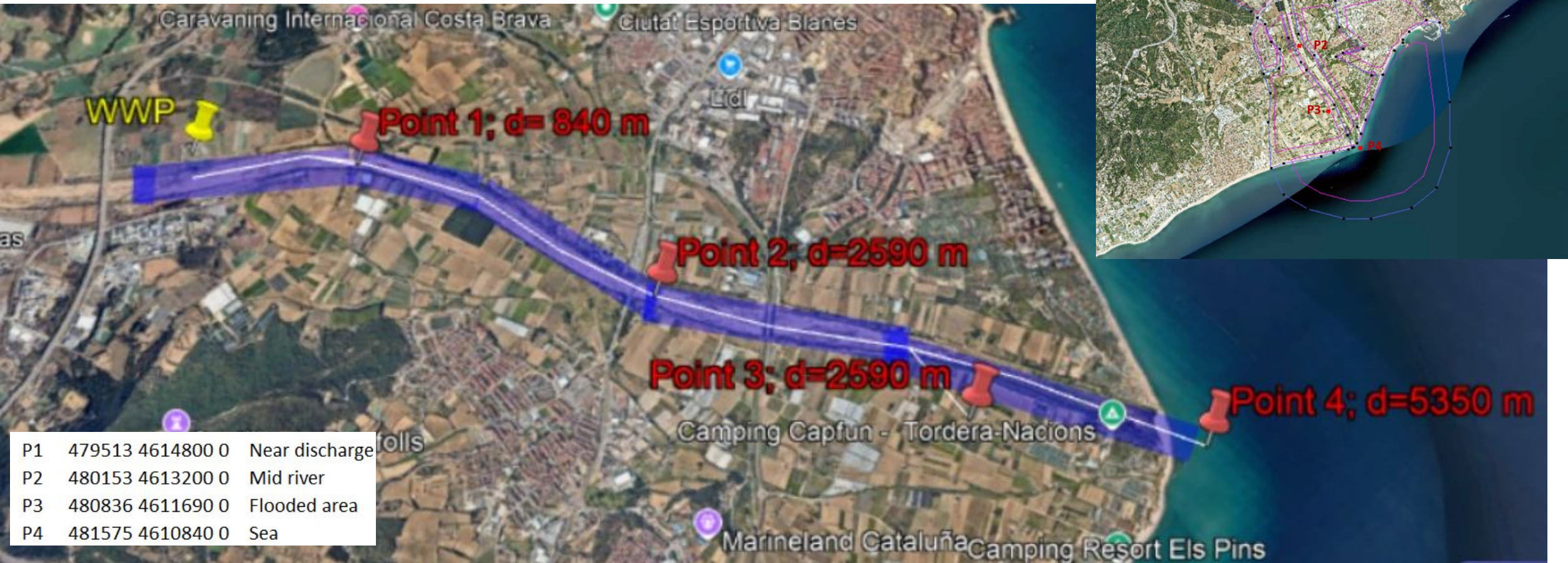
Pollution Results - IBER

Evolution of Pollutants concentration along the river

Location	Source Point	Flood Areas	Outlet /Sea
CBOD (mg/L)	7.8	4.8	5.5
DO/ N-NO3/N-NH3 (mg/L)	49	30	31

Conclusion

How can we make it better ?

- **More precision on calibrating the simulated data on HEC HMS**
- **Investigate the data we made assumptions on**
- **Try different discharge source points to compare their impact**
- **Simulate pollution maps with Waqtel (Telemac)**
- **Investigate on data accuracy with other documentation**

Thank you !