

Uncertainty propagation in Integrated Catchment Models for water quality evaluation.

Antonio Moreno Rodenas

What is Integrated catchment modelling?

- Model based water management practices.
- Control of pollution.
- Design of water systems

OLD designing practices

- Attending to pollution input limitation.
- Model based design.
- Not accounting for natural water characteristics.

WFD



NEW designing practices

- Ecological and chemical control of water bodies.
- Integrated assessment of the interaction between the parts of the water system

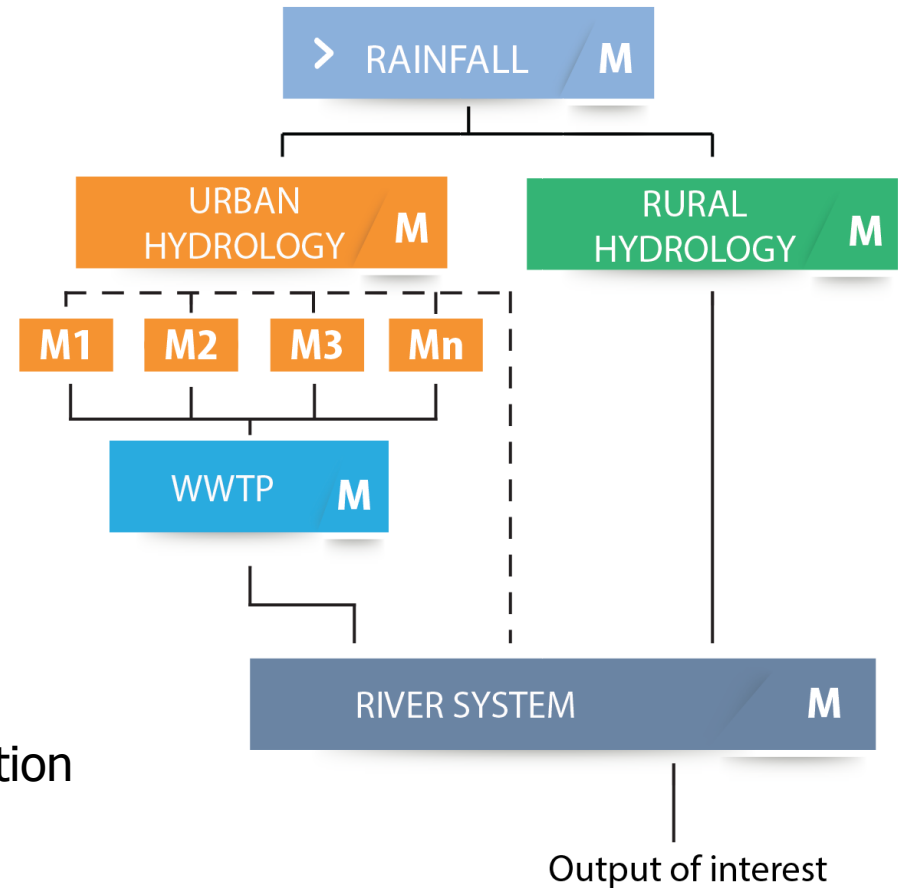
Model philosophy and uncertainty analysis.

Detailed model based

- Multiplatform
- Unidirectional flow of information
- Computationally demanding

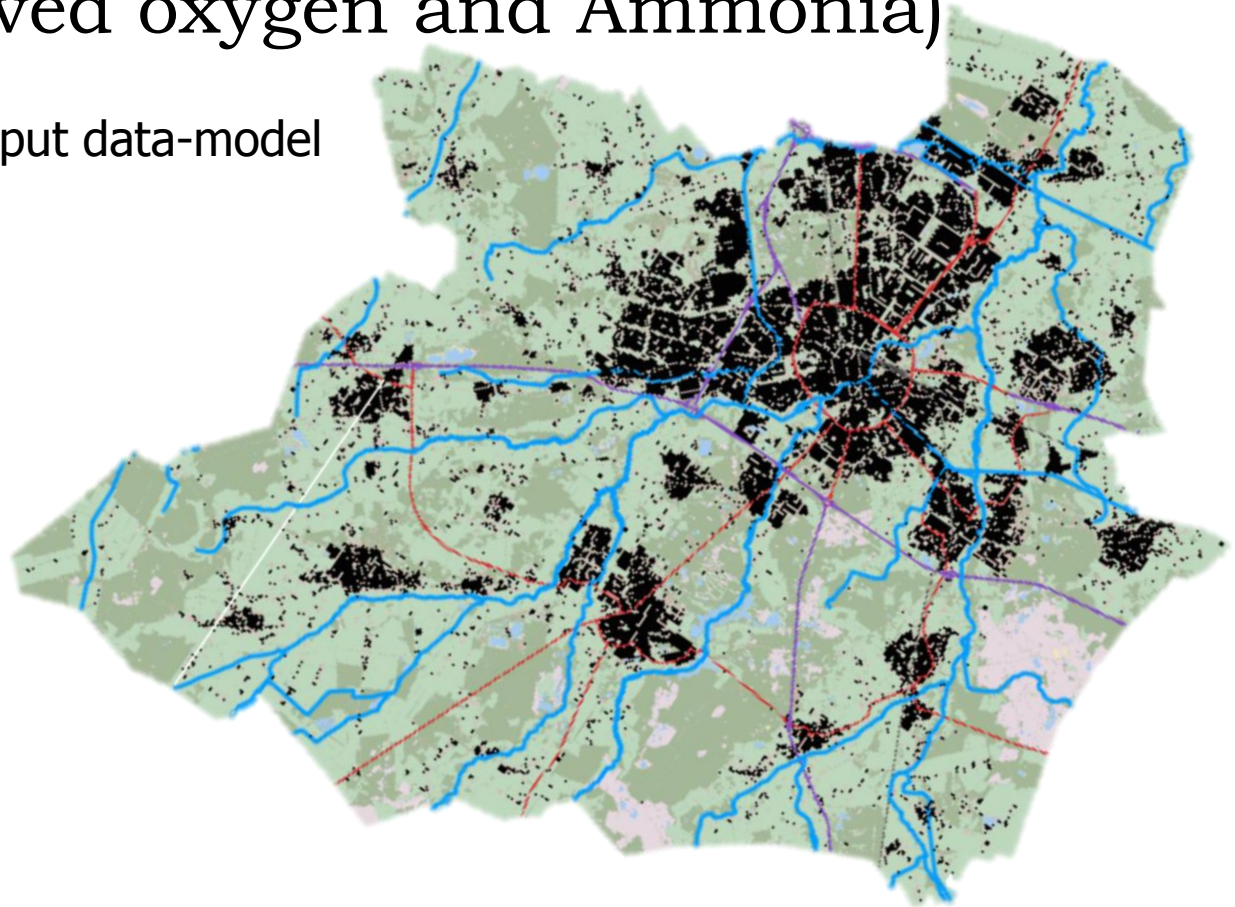
Simplified model

- Uniplatform
- Multidirectional flow of information
- Computationally fast
- Allowing risk analysis and optimization



Optimal selection of rainfall data source for water quality modelling (Dissolved oxygen and Ammonia)

- Trade-off between input data-model complexity
- Aggregation of simplified hydrological catchments
- Pseudo-distributed structure.



Optimal selection of rainfall data source for water quality modeling (Dissolved oxygen and Ammonia).

- Trade-off between input data-model complexity
- Spatial resolution:
 - Change of technique of data acquisition
 1. 1 Common rain gauge
 2. Rain gauge interpolation
 3. Raw radar estimation
 4. Merged radar-rain gauge
- Temporal resolution:
 - Change of model discretization input and structure

Different model structures
Validation performance

$$\text{Rainfall input} \begin{bmatrix} M_{11}(I_1, x_o, \theta_1) & M_{12}(I_1, x_o, \theta_2) & \dots & M_{1n}(I_1, x_o, \theta_1) \\ M_{12}(I_2, x_o, \theta_1) & M_{22}(I_2, x_o, \theta_2) & \dots & M_{2n}(I_1, x_o, \theta_1) \\ M_{13}(I_3, x_o, \theta_1) & \dots & \dots & \vdots \\ M_{41}(I_n, x_o, \theta_1) & M_{42}(I_1, x_o, \theta_2) & \dots & M_{4n}(I_1, x_o, \theta_1) \end{bmatrix}$$

Bedankt voor uw aandacht



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 607000.