

# The HSG guideline document for modelling integrated urban wastewater systems

11<sup>th</sup> ICUD  
Edinburgh

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[www.HSGsim.org](http://www.HSGsim.org)

# Our motivation

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Provide a guideline document to support the application and further development of integrated models for the assessment of IUWS in research and practice

# Who are we?

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- HSGsim

- Dealing with integrated and WWTP modelling
- Central European (mostly German speaking) working group
- Members from Germany, Austria, Switzerland, Luxembourg, Poland, Netherlands, Slovakia
- PhD-student and post-doc level
- Independent from organizations
- Self-organized
- Open

# The guideline document

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- State-of-the-art
- Stepwise approach for integrated modelling according to the HSG guideline
- Case studies
- Further literature

# The guideline document

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- State-of-the-art
  - Regulations / guidelines
  - Water-quality oriented objectives
  - Processes and modelling approaches
  - Model interfaces / coupling techniques
  - Integrated modelling frameworks / software

# The guideline document

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- State-of-the-art
- Stepwise approach for integrated modelling according to the HSG guideline
  - System analysis
  - Processes and criteria
  - Modelling approaches and data
  - Analysis of model and data
  - Model calibration and validation
  - Model application for scenario analysis

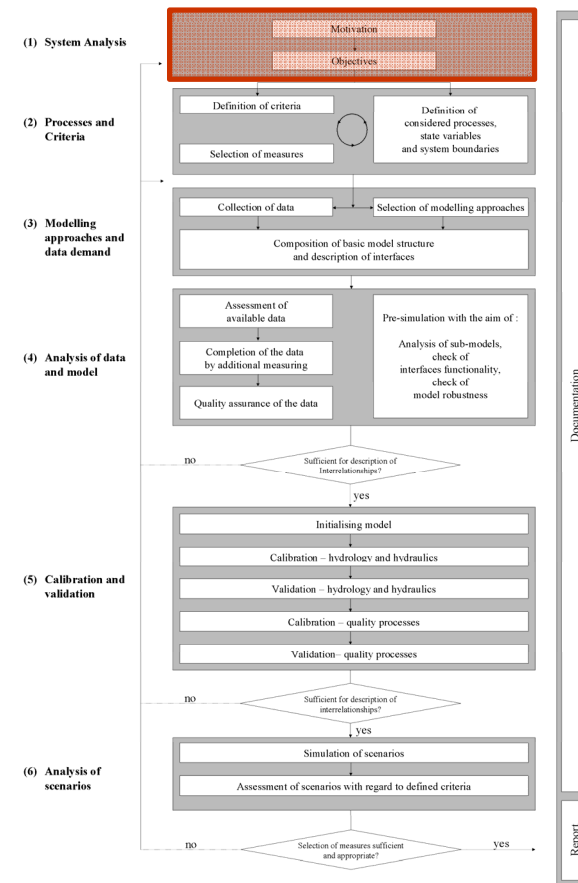
# The guideline document

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- State-of-the-art
- Stepwise approach for integrated modelling according to the HSG guideline
- Case studies
- Further literature

# The HSG-procedure for a systematic setup of integrated models

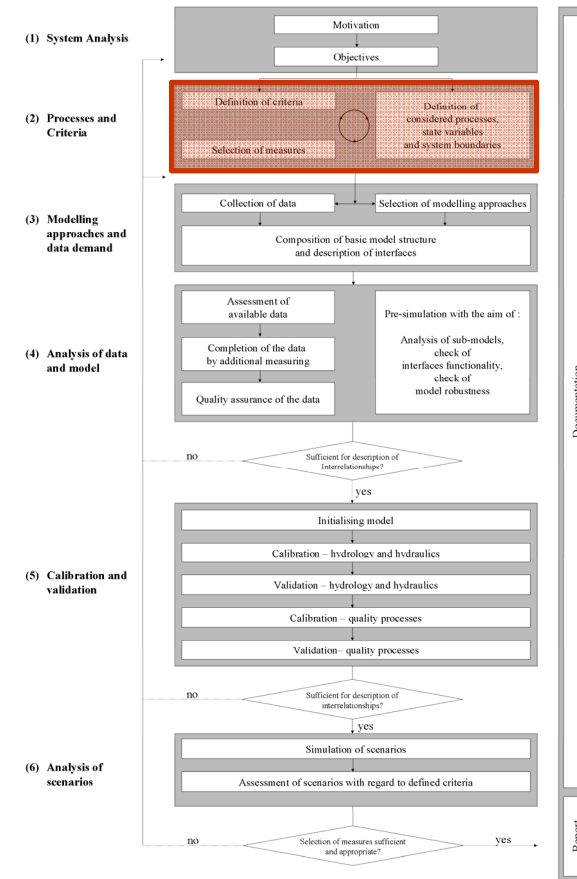
- System analysis
  - Motivation
  - Objectives



# The HSG-procedure

## for a systematic setup of integrated models

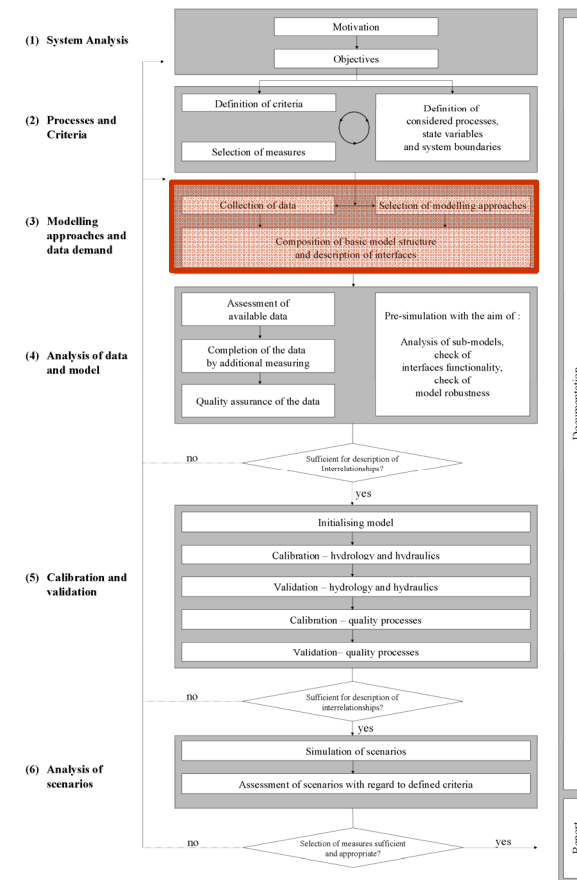
- Processes and criteria
  - Definition of criteria
  - Selection of measures
  - Definition of
    - Considered processes
    - State variables
    - Boundary conditions



# The HSG-procedure

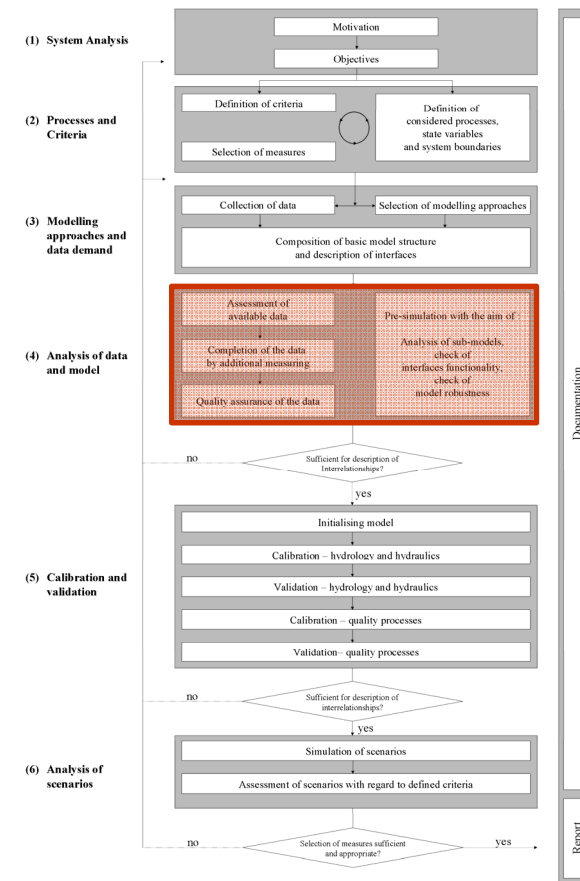
## for a systematic setup of integrated models

- Modelling approaches and data demand
  - Collection of data
  - Selection of modelling approaches
  - Composition of
    - Basic model structure
    - Description of interfaces



# The HSG-procedure for a systematic setup of integrated models

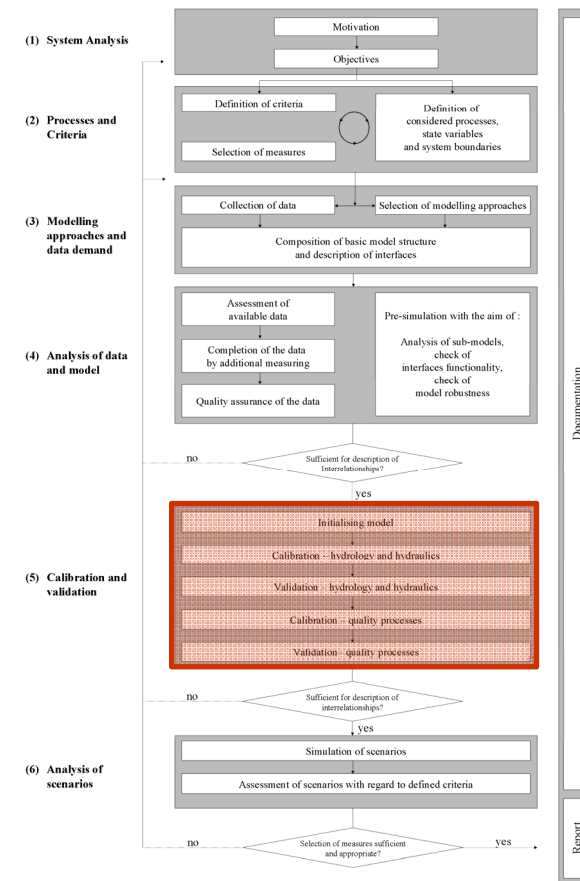
- Analysis of data and model
  - Assessment of available data
  - Completion of data by additional measurement
  - Quality assurance of data
  - Pre-simulation with the aim of
    - Analysis of sub-models
    - Interface functionality
    - Check of model robustness



# The HSG-procedure

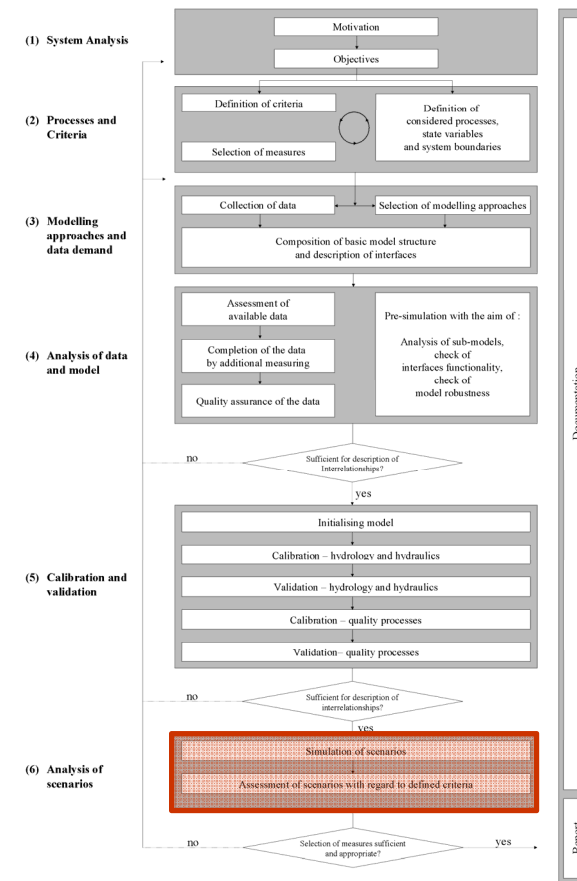
## for a systematic setup of integrated models

- Calibration and validation
  - Initializing the model
  - Calibration and validation of hydrology and hydraulics
  - Calibration and validation of quality processes



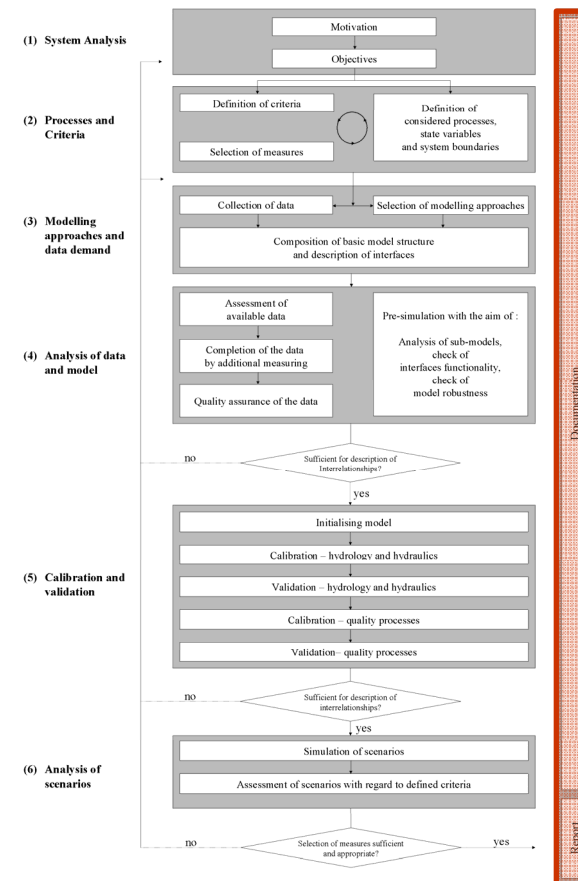
# The HSG-procedure for a systematic setup of integrated models

- Analysis of scenarios
  - Simulation of scenarios
  - Assessment of scenarios with regard to defined criteria



# The HSG-procedure for a systematic setup of integrated models

- Documentation and Report



How to get

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[www.HSGsim.org](http://www.HSGsim.org)

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Thank you!

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