

Modelling SUDS at the catchment scale: Can a simplified model accurately represent complex systems on an annual scale?

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CONTEXT

- Sustainable Urban Drainage Systems (SUDS) are increasingly used to mitigate stormwater runoff. One way to model their cumulative effects at the catchment scale is to model the catchment down to the level of individual land parcels, modelling each device separately.
- This approach requires detailed data and high computational resources, due to the need to conceptualise the hydrological properties of each parcel (runoff, storage, infiltration, evapotranspiration...) and the interactions with other urban compartments (network, aquifer..)
- In order to reduce these computational constraints, these infrastructures are most often represented, at the catchment scale, by modifying one (or more) equivalent parameter(s) characterising the properties of the sub-compartments.

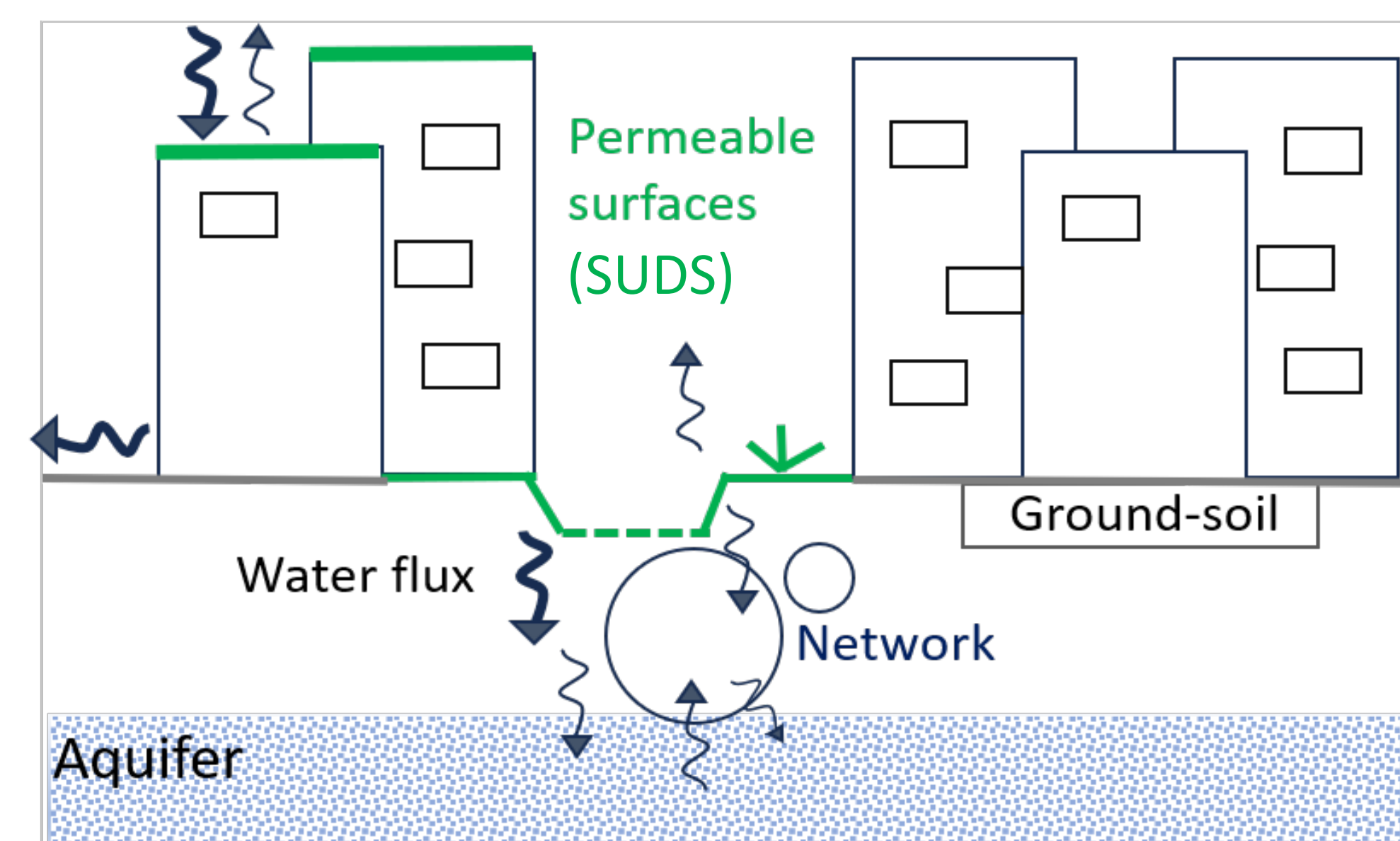


Fig 1. Water fluxes in urban catchments



Fig 2. Exemple of SUDS

To what extent is it possible to simplify infrastructure representation while maintaining realistic hydrological performance?

SCIENTIFIC OBJECTIVES

- Compare the capacity of existing models to simulate the main hydrological processes at the infrastructure scale
- Determine the minimum level of parameterisation required to simulate them at the urban catchment scale

Required profile

- General knowledge of Hydrology
- Good skills in programming
- A strong interest in urban hydrology modelling

THE MISSION

- Conduct an extensive literature review on SUDS modelling tools at the urban catchment scale
- Classify existing tools, describing their hydrological processes and integration at the catchment scale
- Analyze the observed data from two structures (a swale and a permeable parking) to compare the existing models (flow dynamics)
- Calibrate a simplified model developed during the internship based on the analysis of the results

THE RESEARCH UNIT: HYDROSCIENCES MONTPELLIER

- Interdisciplinary research unit located at Hydropolys (Faculty of Pharmacy, Montpellier)
- The student will be immersed in a scientific environment focused on multidisciplinary topics and issues related to water, the environment and health
- This diversity of water-related topics will give the successful candidate a broad overview of the scope of urban hydrology, programming and modelling skills



Tutors from different labs will offer different perspectives on research, the day-to-day lives of researchers, and research networks

Welcome activities will support the student' integration into HSM, **including the coffee-cake on Monday mornings!**