



Systems thinking applied to conceptual urban groundwater model development

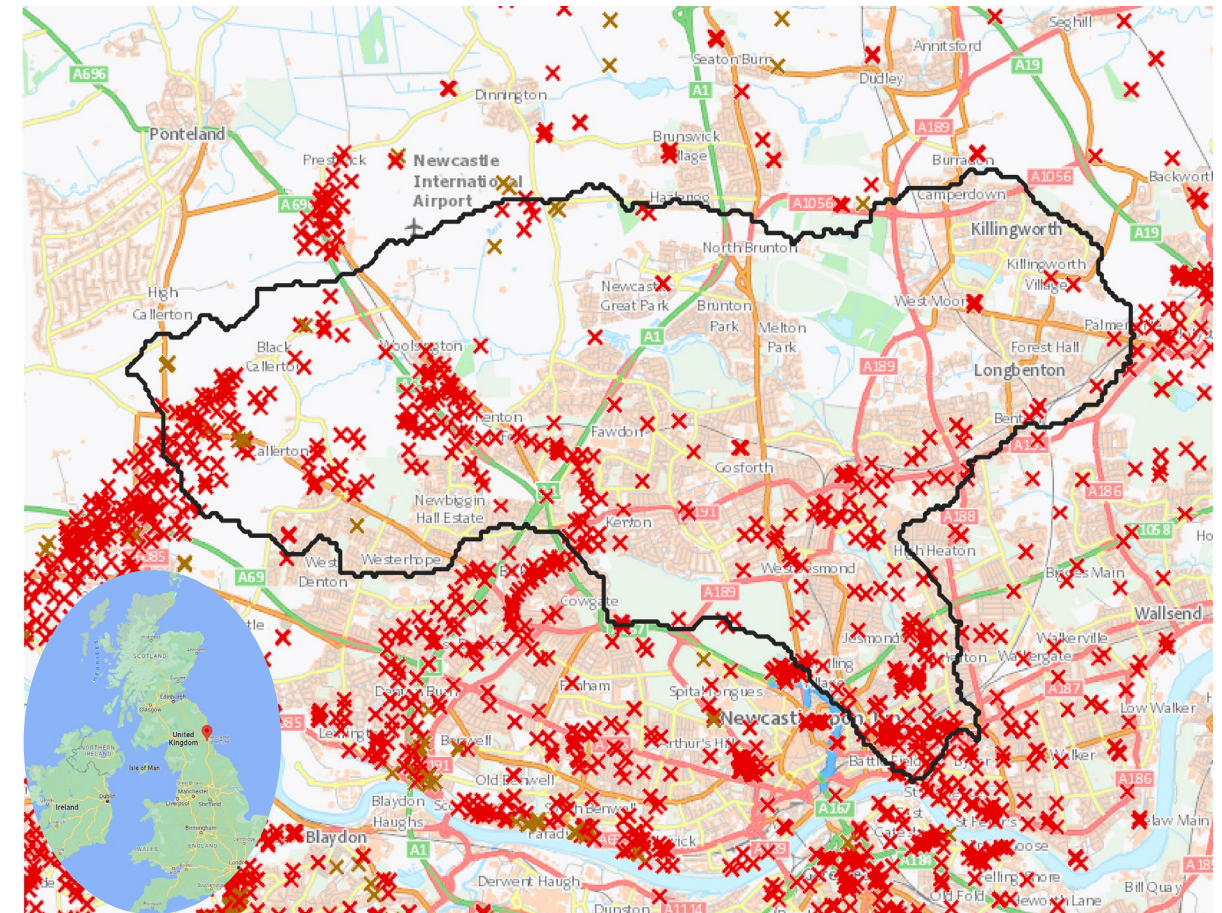
Charalampos Ntigkakis and Brian Thomas

Newcastle University, United Kingdom

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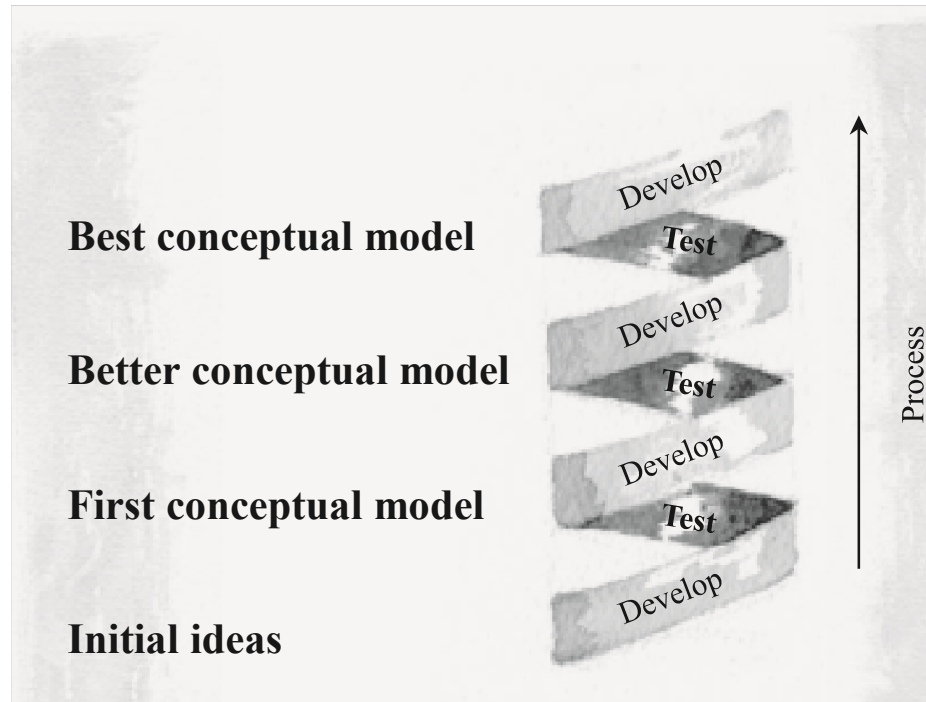
The Ouseburn catchment

- Location: Newcastle upon Tyne, UK
- Urban catchment
- Area $\approx 60 \text{ km}^2$



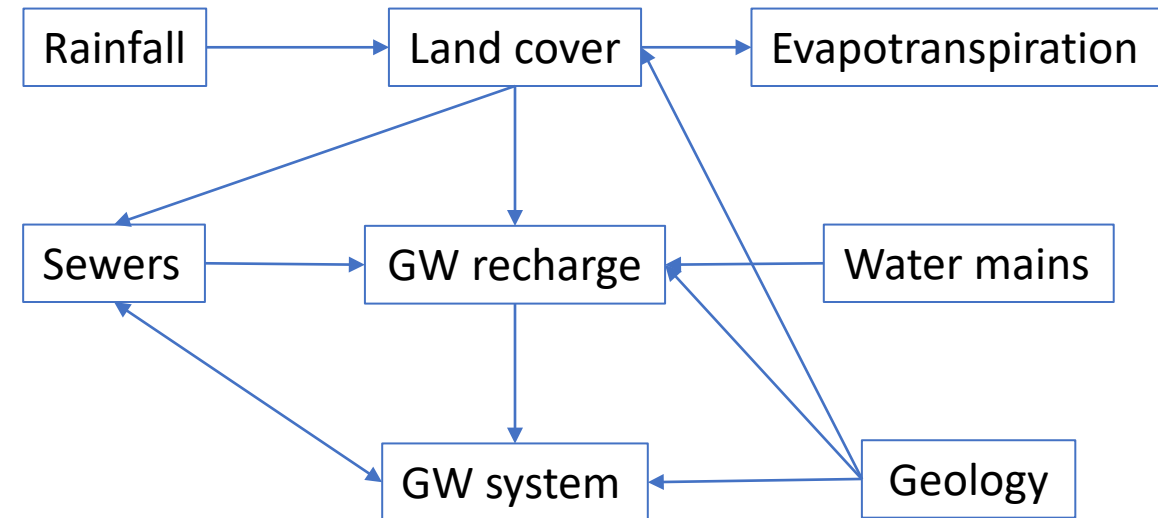
Contains OS data and data from The Coal Authority and Google Maps

Traditional conceptual model

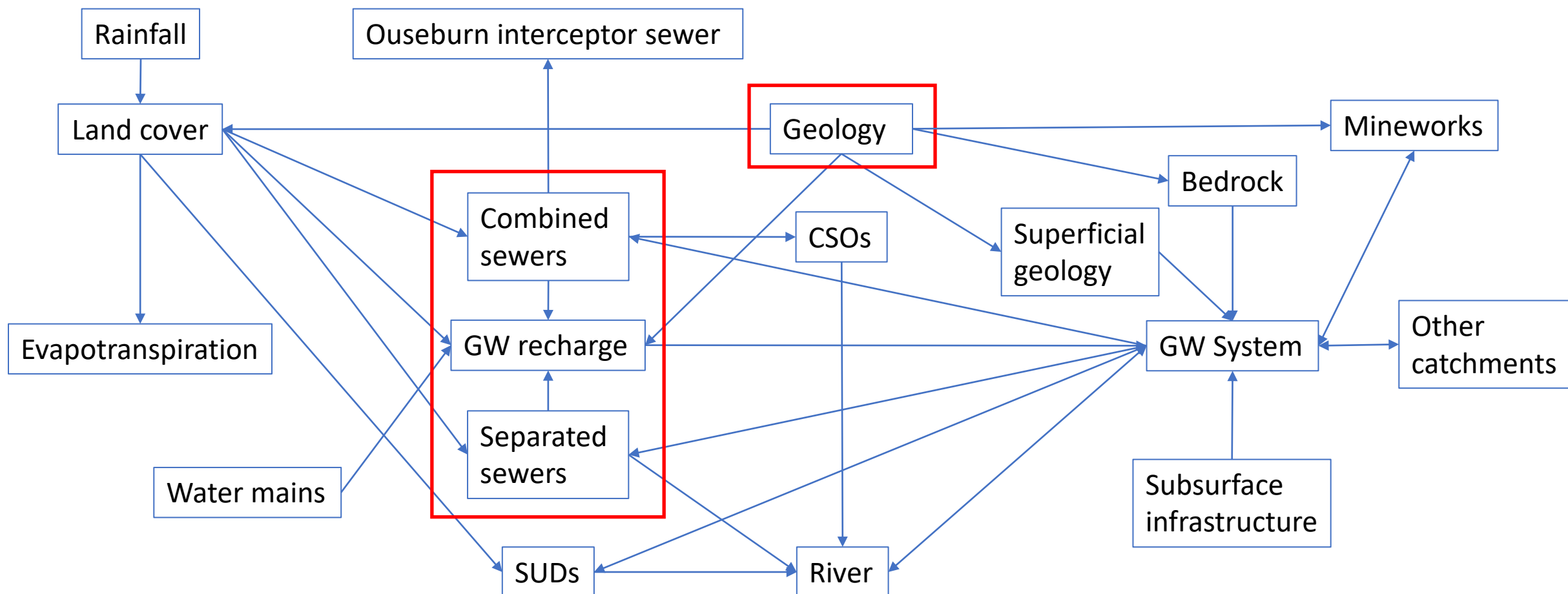


Brassington, F. C., & Younger, P. L. (2010). A proposed framework for hydrogeological conceptual modelling. *Water and Environment Journal*, 24(4), 261–273.

Systems thinking model



Systems thinking in the Ouseburn



Conclusions

- Robust groundwater modelling depends on strong conceptual understanding
- An urban groundwater system comprises of several complex sub-systems
- Increasingly complex systems require new ways to develop conceptual models
- Understanding the hydrologic connections between the sub-systems is key to a strong conceptual model



Thank you!

Questions?