Decision Making Tools:

Overview

Rae Mackay

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Sustainable Water Management Improves Tomorrow's Cities' Health: achievements and way forward

- Scenarios
  - Climate change
  - Population growth
  - Energy minimisation
  - Making space for water
  - Industrial transformation
  - Regeneration
  - Policy revisions
- Strategies
  - SUDS
  - Water saving devices
  - Waste water reuse
  - Decentralised water
  - Natural systems integration
  - Economic incentives
  - Energy recovery
  - Clean technologies

DS for Future and Transition
DS for Present day assessments
DS for Technology Selection

DS for costing and carbon reduction
DS for cost benefit

Features of the SWITCH DS toolset:

- Significant weight is given to the integrated exploitation in IUWM of the 'natural' environment.
- The knowledge repository is designed to deal with aspects of the regulatory environment, legal frameworks, historical data and stakeholder interactions and responsibilities
- Modelling tools provide for indicators spanning a very broad range of time and space scales
- Can explore transitioning impacts across a city
- Designed for wide (Global?) application
- Designed for use within a Learning Alliance framework.

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Decision Making Tools:

City Water Balance

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An Urban Hydrological Model with embedded LC costing energy

Ewan Last
Supervisors
Prof. Rae Mackay
Dr John Bridgeman

Why?
Transitioning and sustainability decisions need to be made collectively and through consideration of existing conditions and possible futures Strategic planning against alternative future scenarios requires comparative analysis using readily prepared indicators.

How?
By applying simplified hydrological modelling at appropriate resolutions from the property to the city scale and coupling this with databases covering energy and costs for a wide range of alternative management options to yield indicator outputs covering quantity, quality, cost and energy.

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Mapping the cities water demand, supply, drainage, treatment and reuse.

Scoping the impact of changing these features either locally or globally

Exploring alternative Water management options

WM Options include: Broad range of BMP's, WW reuse, and Stormwater reuse.

Development and testing completed on Birmingham
Trial applications completed on Accra, Alexandria and Dunedin (nearly)….

Decision Making Tools:

City Water Drain

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From a 1D Network to 2D Model of Urban Flooding

Solomon Seyoum
Supervisors
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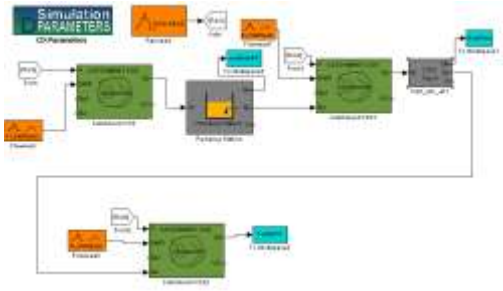
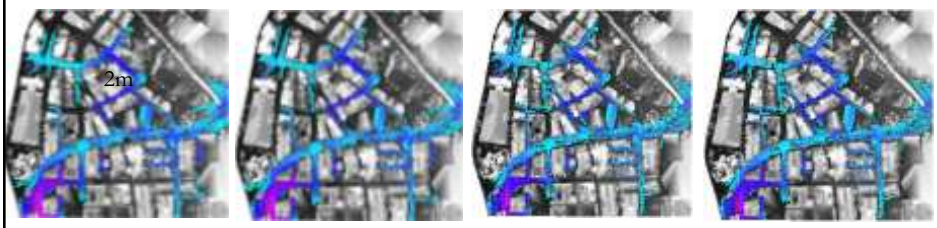
Why?
Climate variability is leading to more dynamic precipitation.
Existing flood management wasn't designed to deal with the greater flood risk
The costs of flood damage are high but with good design do not have to be paid!

How?
By applying simplified hydraulic modelling with downscaled precipitation models and appropriately detailed terrain modelling it is possible to assess pluvial and fluvial risks and to mitigate for these

From City Water Drain to a non-inertial 2D flooding model using a DTM





2m 4m 6m 8m

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Decision Making Tools:

City Water Futures

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An Agent-Based Modelling of City Waterscape Evolution

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Why?

To recognise that all cities evolve internally and at their boundaries.

To observe that evolution is controlled by physical, social, economic and cultural factors.

How?

By applying the concepts and principles of emergence in the development of urban areas and to use cellular automata to explore future development paths

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The Modeling Framework