Flood Damage Assessment in Taipei City, Taiwan

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Outline

- Introduction
- Hydraulic modelling
- Flood damage assessment
- Discussions
- Conclusion
Introduction

Image source: CWB, Taiwan
Taipei City
• Taipei City
  – 272 km²; 2.6 M inhab.
  – 9,600 inhab./km²
• Central Taipei Area
  – 120 km²; 1.7 M inhab.
  – 14,200 inhab./km²
Hydrology and hydraulic attributes

- 200yr levees
- 25 drainage networks (5y, 78.5mm/h)
- 900cms pumping capacity
- 100 + mm/h by typhoons
Hydraulic modelling

- Coupled 1D/2D model
  - 1D SWMM
  - 2D UIM
- Trunk sewer considered
- Pluvial flooding only
- Uniform spatial rainfall distribution
- 24 hours events
Inundation hazard map (10y)
Inundation hazard map (25y)
Inundation hazard map (100y)
Inundation hazard map (200y)
Flood damage assessment

Land uses → Depth → Depth-Damage Curves (DDC) → Damage
Land uses
Depth-Damage Curves (DDCs)

- Field investigations
- Tax revenue office
  - Flood damage claim reports of individual household and business (aggregated)

- Su et al., 2005. A Grid-Based GIS Approach to Regional Flood Damage Assessment.

CORFU FP7 Collaborative research on flood resilience in urban areas
Depth-Damage Curves (DDCs)

Flood damage map (10y)
Flood damage map (25y)
Flood damage map (50y)
Flood damage map (100y)
Flood damage map (200y)
Shops and business office buildings
Shops in old communities
Commercial and Industrial
## Flood damage assessment

<table>
<thead>
<tr>
<th>Return period (year)</th>
<th>Inundated area (Km²)</th>
<th>Flood damage (US $ million)</th>
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Flood damage EP curve

$ USD (million)

Exceedance probability

Household
Commercial
Industry
Government
Total flood damage
## Flood damage assessment

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Average Annual Flood Loss (AAFL) Expected Annual Damage (EAD)  
31.98  15.58  3.22  17.93  68.70
On-going studies

- Damage assessment for individual buildings
- Resolution and accuracy
- DDCs for other land uses to be determined
- Roadside parking
- Basements and underground infrastructures
- Urban redevelopment
- Social-vulnerability assessment
Concluding remarks

- Flood damage of various rainfall periods
- Average annual flood loss (AAFL)/Expected Annual Damage (EAD)
- High risk areas identified
- Needs of better/detailed data
- Potential applications to various impact
Acknowledgements

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Further information

• http://corfu7.eu/

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