The importance of understanding geohazards for urban resilience: A study of Thessaloniki, Greece and its participation in the 100 Resilient Cities Network

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Building Resilience to Geohazards in the Face of Uncertainty

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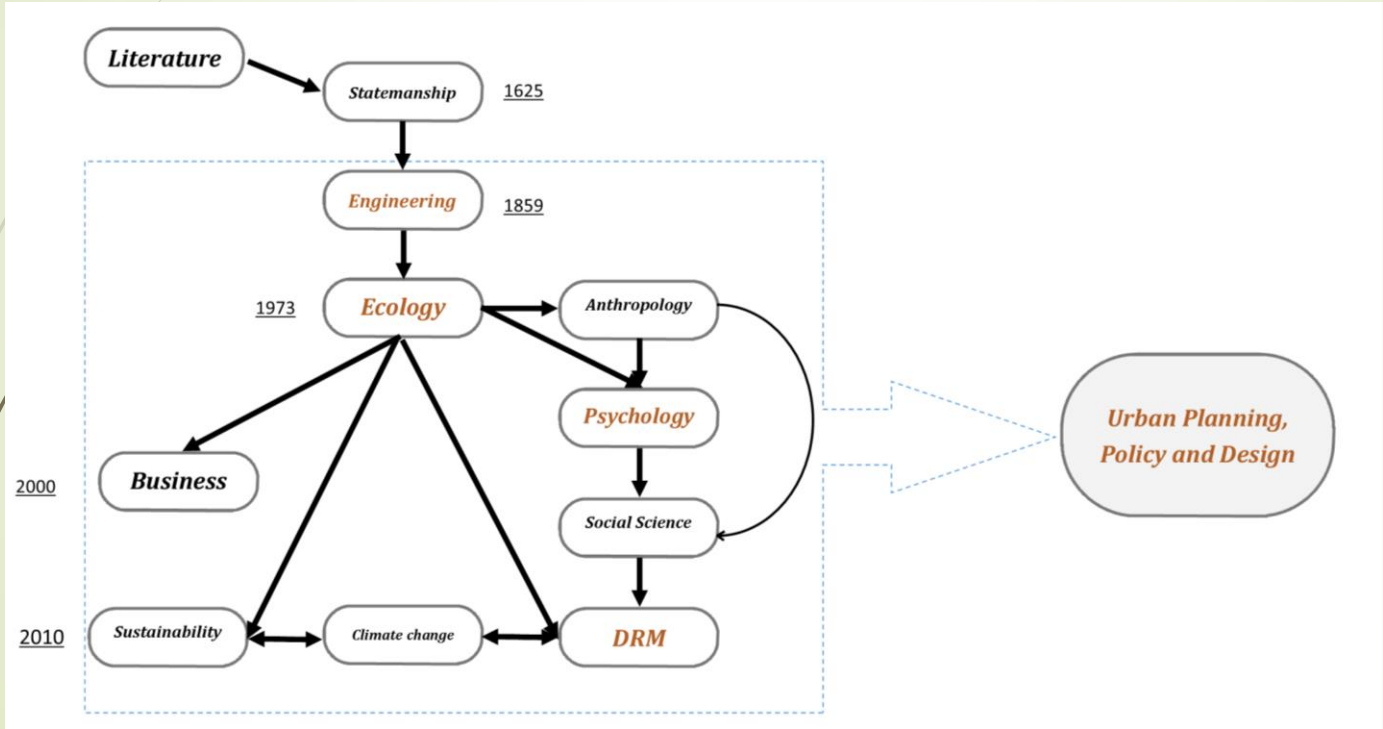
Overview

- Introduction
- What is resilience/urban resilience
- The 100 RC Programme
- Thessaloniki Greece Case
  - Outline
  - Urban geohazards
    - Earthquakes
    - Surface Flooding
- Geological neglection
- Discussion

Evolution of Resilience throughout time



Basic contrasting definitions

Engineering	Evolutionary
Static	Dynamic
Equilibrium	Dis-equilibrium
Stability	Disruption
Expected	Unexpected
Efficiency	Existence
End state	Transition state

What is urban resilience?

Urban resilience refers to the ability of an urban system-and all its constituent socio-ecological and socio-technical networks across temporal and spatial scales-to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change, and to quickly transform systems that limit current or future adaptive capacity.

Meerow et al, 2016

Social Turn in Resilience Policies

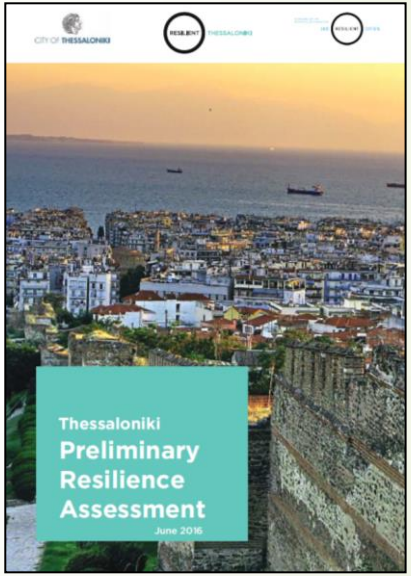
- The ‘social turn’ of resilience literature emphasises on its theorising as a deliberate process towards facing uncertainty rather than a simply outcome-oriented developmental directive (Cardona, 2003; Manyena, 2006). Evolutionary resilience principles are continuously being enacted in urban practice attempting to generate new possibilities and open pathways for learning, innovation and smart use of technology by the civil society aiming at nourishing a spirit of ‘shared responsibility’ among all parts of the community (Coaffee, and Lee, 2016).

The 100 Resilient Cities Network

- Established in 2014 by the Rockefeller Foundation in collaboration with ARUP
- Focuses on municipal/metropolitan scale
- Categorises resilience 4 categories, 12 key indicators, 54 sub-indicators and 130-150 variables
- Provides funding, networking and professional assistance to member cities
- Builds upon the idea of tackling both chronic stresses and acute shocks
- Attempts to assess the institutionalisation of resilience in cities where implemented

Thessaloniki Case Study

- 1917 •The Big Fire
- 1956 •New Building Legislation
- 1978 •Major Earthquake in the city
- 1986 •Industrial accident in the Oil Refinery
- 2010 •Implementation of the first Austerity Measures
- 2016 •Major floods in the Municipality of Thermaikos
  •Generation of the first refugee camp

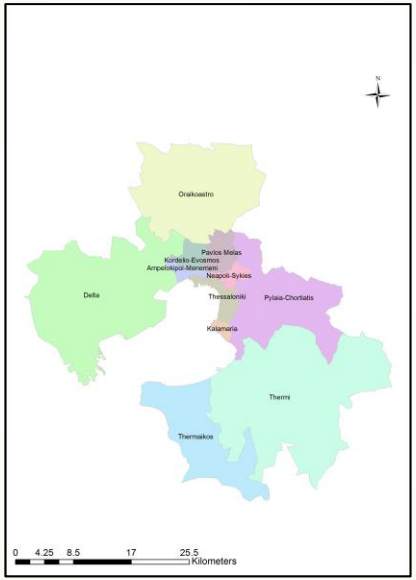


Thessaloniki under 100 Resilient Cities Network

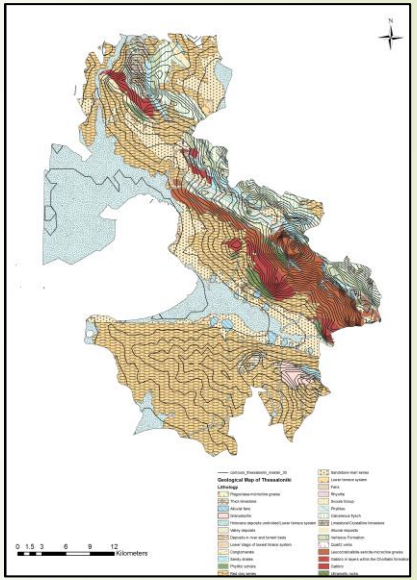
- **Phase 1**: Preparation of a Preliminary Resilience Assessment (PRA) in order to identify the vital areas of interest for the RS.
- **Phase 2:** Formulation of a RS including fields of opportunity and initiatives based on Discovery Areas of Phase 1.
- **Phase 3:** Implementation RS and action plan.

Thessaloniki Urban setting

The metropolitan area of Thessaloniki



Metropolitan Municipalities



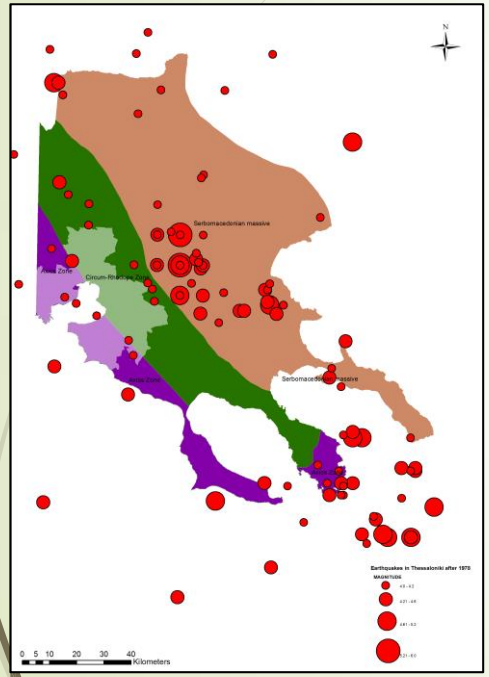
The metropolitan area of Thessaloniki

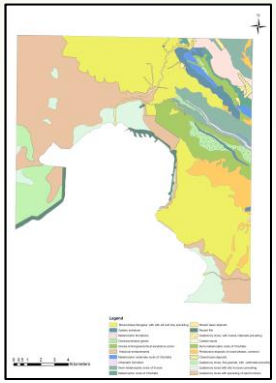
Primary shocks and stresses identified

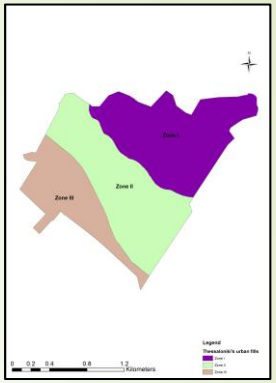
Shocks	Stresses
• Earthquake • Surface flooding • Heatwaves • Fire at peri-urban forest • Atmospheric pollution incident	• Unemployment • Aging Building and Mobility infrastructure • Lack of access to affordable health care • Insufficient integration in planning

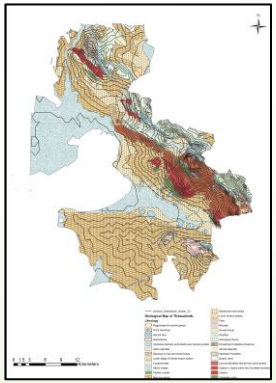
Urban Geohazards

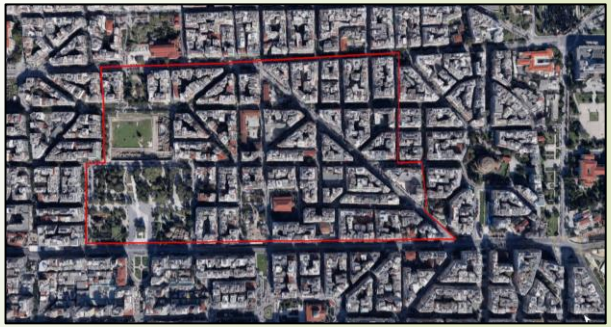
Earthquakes



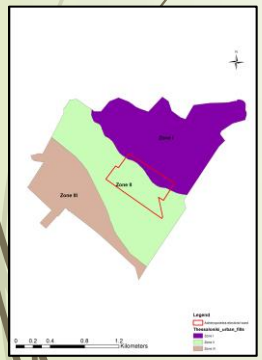


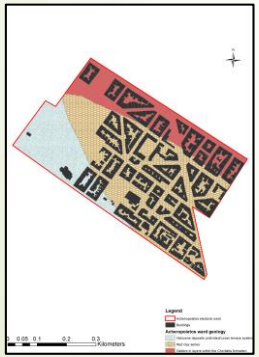






Acheropoietos neighbourhood





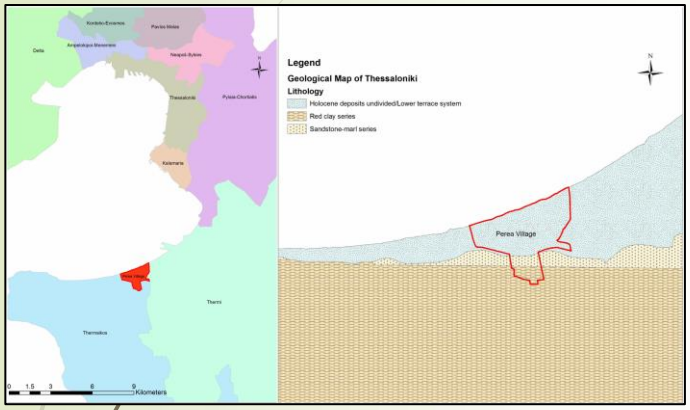
Major factors for Thessaloniki's vulnerability to earthquakes

- Aging building stock
- **Extremely high building densities**
- Insufficient and semi-regular vertical development
- Dominant presence of residential 6-9 storey buildings
- Fragmented green and open spaces
- Constant presence of vulnerable populations in schools
- **Thick and damage prone urban fills**
- **Unstable and damage prone underlying bedrock geology**

Urban Geohazards

- The second most important acute shock for the city
- Extended floods in 2009 and 2014 in the urban catchment of Thessaloniki as well as in 2005, 2006 and 2016 in the Municipality of Thermaikos
- RS does not seem to follow a specific approach towards effectively integrating them as part of the proposed policy

Perea village



Location of Perea village and underlying geology

Disasters from the flash-flood of September 2016 in Perea

Perea village

Physical geography and morphology

Extensive urbanisation

RS's lack of focus

- Local topography and geomorphology
- Surface and subsurface geological conditions
- Condition of the building stock
- Connection of emergency planning with urban planning and design

Conclusions

- Urban geology tend to be ignored in modern resilience policies
- Thessaloniki's RS acknowledges geohazards' potential impact but fails to address them adequately in policy making
- Uneven focus on endogenous process
- Local topography and geomorphology completely neglected
- Problematic operationalisation of resilience policy

Questions?