

# UNDERSTANDING HOW DYNAMIC EXPOSURE AFFECTS RISK BY USING A LAND USE MODEL



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## BUILDING ON THE EVALUATION OF RISK: INCORPORATING THE EVOLUTION OF HAZARD RISK OVER TIME WITH DYNAMIC MODELLING OF EXPOSURE.

### MOTIVATION:

A risk management approach considers the interaction of three elements<sup>1</sup>:



A robust assessment of risk must evaluate not just the natural hazard risk today, but also how risk evolves in the future. Following a risk management approach, it is common to look at how the hazard component will change in the future (for example due to climate change) but it is rarer to consider how exposure, driven by socio-economic development<sup>2</sup>, changes into the future. This poster outlines proposed research to incorporate dynamic exposure modelling into a risk management approach by using a land use model. Hence:

**The principal focus of this research is incorporating dynamic exposure modelling into the evaluation of risk**

### INCORPORATING DYNAMIC EXPOSURE: KEY QUESTIONS

#### How will dynamic exposure be incorporated?

By using Metronamica, a transition potential based land use model (see next box) to simulate land use in the future.

#### Is the goal to predict the future?

No, the goal of using a land use model is to simulate possible scenarios for the future based on given inputs such as varying demographics and zoning plans.

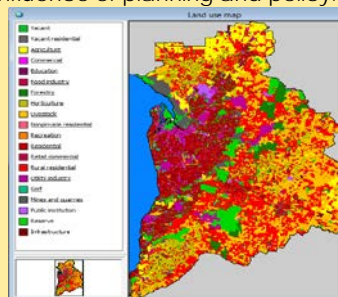
#### What are the key contributions?

- ▶ A robust and repeatable simulation method;
- ▶ An assessment of future natural hazard risk in Adelaide given potential future socio-economic scenarios; and
- ▶ A framework for more robust assessment of land use planning based mitigation strategies.

### DYNAMIC EXPOSURE: HOW THE LAND USE MODEL WORKS

Land use is modelled annually based on four factors defining the potential for different land uses:

- ▶ Neighborhood rules, defining the attractive/repulsive forces different land uses exert on each other;
- ▶ Accessibility, the roles of infrastructure;
- ▶ Suitability, the physical ability to support a certain land use class; and
- ▶ Zoning, the influence of planning and policy.



An example land use map generated for the Greater Adelaide Region

By inputting different scenarios (land use demands, zoning policies) different simulations are generated. These can then be used to evaluate risk into the future.

- REFERENCES:**
1. Natural Disaster Funding Arrangements Productivity Commission Inquiry Report, Aus. Government, 2014
  2. Te Linde et al., 2011. Future flood risk estimates along the river Rhine

