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## **Coastal Cities Affected by Sea Level Rise and Forrester's 'Urban Dynamics'**

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# Coastal Cities Affected by Sea Level Rise and Forrester's 'Urban Dynamics'

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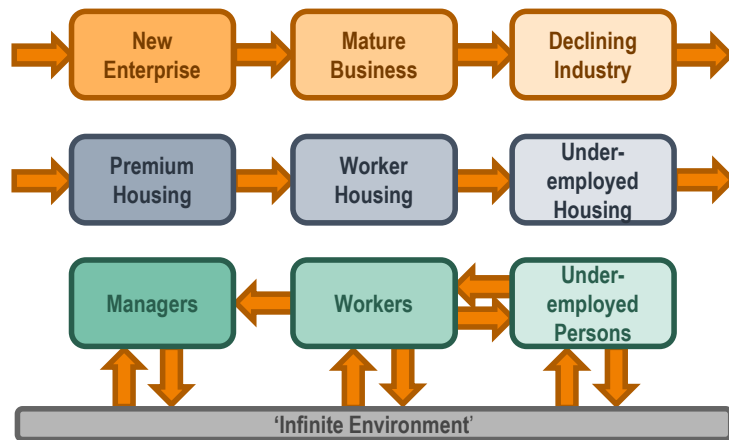
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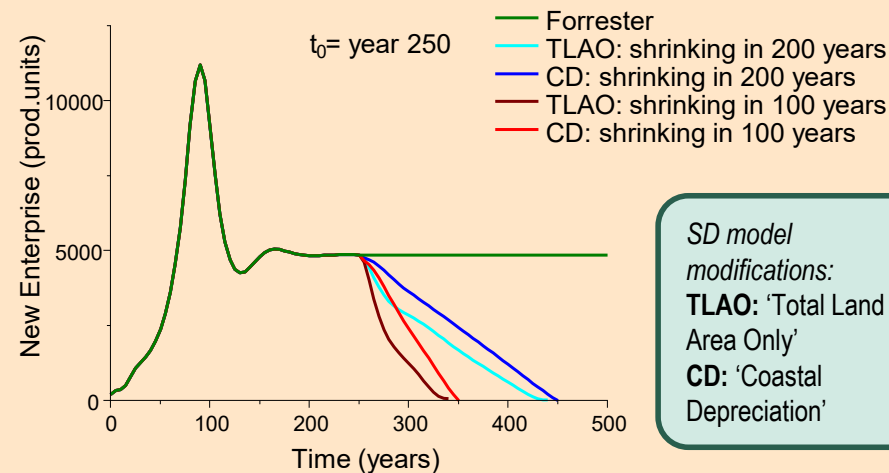
- ✓ System dynamics (SD) is a powerful modelling approach for 'what-if' simulations in climate and environmental problems
- ✓ To describe the pathways of coastal urban adaptation, we develop two modifications of the seminal Forrester's 'Urban Dynamics' model
- ✓ Currently, these modifications are tailored to simulate the 'business-as-usual' (BaU) coastal urban scenario with no adaptation actions
- ✓ In our extensions of Forrester model, sea level rise and related coastal hazards lead to a gradual reduction of city area and severe damages to urban infrastructure
- ✓ Our simulations tell us a narrative of urban decline under BaU – as opposed to Forrester's original simulations where the urban system converges to equilibrium
- ✓ We also develop simple reduced models of the dynamics of urban wealth that are in qualitative agreement with the results of our modifications of the Forrester model

## Forrester's 'Urban Dynamics': a simplified structure

Adopted from (Stonebraker, 1972), with simplifications



## Simulated dynamics of coastal urban industry



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