

Title: Adaptive Decision-making in an Urban-Coastal Agent Modeling Framework

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Abstract: We present an agent-based model (ABM) of a coastal city describing adaptive agent behavior in a dynamically changing environmental system. Based on the VIABLE framework, the model is run in Netlogo software, representing an urban planner who adapts to mitigate damages to the city resulting from sea level rise and subsequent extreme storm and flood events. To this end, capital generated by the city is invested in one of two adaptation options: building up coastal defenses, or relocating vulnerable parts of the coastal communities inland. As the simulation progresses, gradually rising sea levels and randomly occurring extreme sea level events incur damages, and the agent alters its investments to increase its value among the alternative action pathways, adaptively tipping to different modes of behavior. Results show the conditions for agent responses to the changing environment through priorities for investment patterns, along with successes in mitigating damages.