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How will we move: Demographic change and migration due to sea-level rise in the United States

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Abstract:

The warnings of sea-level rise driven migration first appeared in the scientific literature in the late 1970s when increased recognition that disintegrating ice sheets could drive people to migrate from coastal cities. Previous attempts to model this potential sea-level rise driven migration eschew two important considerations. First, sea-level rise migration models lack the crucial feedback loop whereby sea-level rise migrants alter the demographic trajectory in both their origin and destination. If sea-level rise forces millions of people further inland, a potential domino effect could result, further enhancing migration to more distant locations and further suppressing migration to coastal areas. Second, modelers have chosen to model migrants as age-less and sex-less individuals, overlooking well-established relationships between migration propensity and demographic characteristics. Here, we combine demographic models, flood hazard models, and a machine learning model built on 40 years of environmental migration in the US to project the US population distribution of US counties, accounting for anticipated demographic change, migration probabilities, and sea-level rise. Our initial results suggest demographic forces could operate as a significant “drag” on some sea-level rise migration, with some people becoming “demographically trapped” in increasingly hazardous coastal areas. Our results also suggest that the demographic implications of climate migration go far beyond simple displacement estimates, as population momentum from climate migrants multiplies the demographic effects in both origin and destination areas.

Keywords: Sea level rise; climate adaptation, human migration, climate change demography