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Editorial

Estimating Population Exposure to Sea-Level Rise and the Relevance for Migration

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EDITORIAL

This analysis examines worldwide or near-global estimates of population exposure to SLR and related risks, as well as later estimates of population migration as a result of this exposure. We found 33 papers that offer worldwide or near-global estimates of population exposure to SLR and associated hazards. According to the definitions in the articles, they fall into three primary kinds of exposure:

- The number of individuals living in floodplains that are subject to coastal flood events with a defined return time
- The population living in low-elevation coastal zones
- The population living in floodplains that are subject to coastal flood events with a specific return period.

Twenty of the 33 papers look at the relationship between population movement and SLR. We evaluate datasets, analytical tools, and the challenges of calculating SLR exposure followed by potential human migration in our analysis of the exposure and migration data. We emphasise the intricate links between SLR, exposure to its effects, and migration. Diverse socioeconomic, demographic, institutional, and political factors influence human mobility to and from coastal areas; there may be 'trapped' populations as well as those who prefer not to move for social, cultural, and political reasons; and migration can be delayed or prevented through other adaptive measures. While global estimates of exposed and potentially migrating populations show that SLR poses a significant threat to populations living in low-lying areas near or on coastlines, more research is needed to better understand the interactions between localised SLR and related hazards, social and political contexts, adaptation options, and potential migration and Ingram Micro (IM) mobility decision-making.

According to the Intergovernmental Panel on Climate Change, Global Mean Sea-Level Rise (GMSLR) was 0.12 m-0.21 m between 1902 and 2015. Additional Sea-Level Rise (SLR) of 0.43 m-0.84 m is expected by 2100, compared to 1986-2005 (0.29 m-1.10 m, probable range), though this is highly dependent on the rate of ice sheet melting in Greenland and Antarctica, so it may be much higher. SLR is currently caused by climate change in two ways: sea water expanding as it absorbs heat from the atmosphere (thermal expansion) and land-based snow and ice melting (such as from glaciers). Infrastructure damage, coastal erosion, freshwater salination, and terrestrial habitat loss have all been reported as a result of SLR interacting with other climatic phenomena like as increased storms and wave action. Human health and well-being, cultural and natural heritage, freshwater, biodiversity, agriculture, and fisheries are all expected to be impacted by future SLR. As a result, several attempts to estimate populations exposed to SLR have been performed on a global scale. While diverse definitions, techniques, and scenarios are used in these assessments, the goal is to estimate the number of people who may be directly affected by SLR and related consequences, which is defined as "exposure." SLR, subsidence, coastal extreme weather, land elevation, population distribution, land-surface features, adaptation alternatives, and socio-economic change scenarios are all included in the studies. According to one of the first global vulnerability studies, 200 million–250 million people were exposed to coastal flooding each year (in 1990), defined as living below the 1-in-1000-year extreme sea level, and that 1 m of GMSLR would increase exposure by 50% assuming no other changes.

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