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TITLE: A global ranking of port cities with high exposure to climate extremes

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ABSTRACT:

This paper presents a first estimate of the exposure of the world?s large port cities (population exceeding one million inhabitants in 2005) to coastal flooding due to sea-level rise and storm surge now and in the 2070s, taking into account scenarios of socio-economic and climate changes. The analysis suggests that about 40 million people (0.6% of the global population or roughly 1 in 10 of the total port city population in the cities considered) are currently exposed to a 1 in 100 year coastal flood event. For assets, the total value exposed in 2005 across all cities considered is estimated to be US$3,000 billion; corresponding to around 5% of global GDP in 2005 (both measured in international USD) with USA, Japan and the Netherlands being the countries with the highest values. By the 2070s, total population exposed could grow more than threefold due to the combined effects of sea-level rise, subsidence, population growth and urbanisation with asset exposure increasing to more than ten times current levels or approximately 9% of projected global GDP in this period. On the global-scale, population growth, socio-economic growth and urbanization are the most important drivers of the overall increase in exposure particularly in developing countries, as low-lying areas are urbanized. Climate change and subsidence can significantly exacerbate this increase in exposure. Exposure is concentrated in a few cities: collectively Asia dominates population exposure now and in the future and also dominates asset exposure by the 2070s. Importantly, even if the environmental or socio-economic changes were smaller than assumed here the underlying trends would remain. This research shows the high potential benefits from risk-reduction planning and policies at the city scale to address the issues raised by the possible growth in exposure.

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