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TITLE: Future Coastal Population Growth and Exposure to Sea-Level Rise and Coastal Flooding - A Global Assessment

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ABSTRACT:

Coastal zones are exposed to a range of coastal hazards including sea-level rise with its related effects. At the same time, they are more densely populated than the hinterland and exhibit higher rates of population growth and urbanisation. As this trend is expected to continue into the future, we investigate how coastal populations will be affected by such impacts at global and regional scales by the years 2030 and 2060. Starting from baseline population estimates for the year 2000, we assess future population change in the low-elevation coastal zone and trends in exposure to 100-year coastal floods based on four different sea-level and socio-economic scenarios. Our method accounts for differential growth of coastal areas against the land-locked hinterland and for trends of urbanisation and expansive urban growth, as currently observed, but does not explicitly consider possible displacement or out-migration due to factors such as sea-level rise. We combine spatially explicit estimates of the baseline population with demographic data in order to derive scenario-driven projections of coastal population development. Our scenarios show that the number of people living in the low-elevation coastal zone, as well as the number of people exposed to flooding from 1-in-100 year storm surge events, is highest in Asia. China, India, Bangladesh, Indonesia and Viet Nam are estimated to have the highest total coastal population exposure in the baseline year and this ranking is expected to remain largely unchanged in the future. However, Africa is expected to experience the highest rates of population growth and urbanisation in the coastal zone, particularly in Egypt and sub-Saharan countries in Western and Eastern Africa. The results highlight countries and regions with a high degree of exposure to coastal flooding and help identifying regions where policies and adaptive planning for building resilient coastal communities are not only desirable but essential. Furthermore, we identify needs for further research and scope for improvement in this kind of scenario-based exposure analysis.

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