Global projections of coastal flood risk

Michalis Vousdoukas, Lorenzo Mentaschi, Evangelos Voukouvalas, and Luc Feyen

Joint European Research Centre, IES, Ispra, Italy (michail.vousdoukas@ec.europa.eu)

Global warming is expected to drive increasing extreme sea levels (ESLs) and flood risk along the world's coastline. In the present contribution we present coastal flood risk projections from the combined effect of climate change and socio-economic development. Probabilistic ESL projections are obtained by combining projections of (i) SLR; (ii) resulting changes in tides; and (iii) waves, storm surge and tropical cyclones; with ii-ii obtained from dynamic simulations, covering the present century, and considering the latest CMIP5 projections for RCP4.5 and RCP8.5. The resulting flood risk is quantified through hydrological modelling taking place at 100 m resolution. Changes in the physical domain are combined with gridded projections of socioeconomic development considering different Shared Socioeconomic Pathways (SSPs). Several of the Pacific and Caribbean Small Island Developing States appear among the most affected countries in terms of the relative increase in both the number of people exposed to flooding, as well as the expected annual damage. Asia appears as the continent to be more affected by future coastal risk, in particular Pakistan, Sri Lanka, and several countries along the west part of the continent. On the other hand, negative population growth drives a reduction in the number of people exposed to coastal flooding among countries like Japan, Finland, Germany and Poland.