



Global coastal flood risk in the 21th century – an assessment with the DIVA model

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In recent years, there has been a lot of interest in global estimates of coastal flood risk and adaptation costs associated with sea-level rise as these may be one of the most costly consequences of climate change. Uncertainties about these estimates have, however, hardly been explored and are usually not reported upon. This paper presents results from the ISI-MIP-project where the DIVA model was used for assessing coastal flood risk and adaptation costs by sampling some of the uncertainty dimensions for which we expect impacts to be most sensitive to. These include regional sea-level rise scenarios (with ice shield melt contributions) computed from four different GCMs using four different representative emission pathways (RCPs), changes in exposure under five shared socio-economic pathways (SSPs), and adaptation models assumed (i.e. constant dike heights, constant protection levels, protection levels increasing with wealth). We consider flood risk in terms of the expected annual damage to assets and the expected annual number of people flooded as well as adaptation costs in terms of dike capital costs and maintenance costs. Preliminary analysis suggests that adaptation costs and residual flood risks are most sensitive to the adaptation model used, which further suggests that future work needs to explore adaptation options and models in more detail. We also find that impacts are about as sensitive to socio-economic development as they are to sea-level rise. For adaptation, this suggests that steering future development away from the coast is an efficient strategy. Finally, local factors such as regional sea-level rise attained under different GCM patterns and relative sea-level rise due to land subsidence may be the factors risks are most sensitive to for some locations.