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Supplement of

Global-scale benefit–cost analysis of coastal flood adaptation to different flood risk drivers using structural measures

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S1 FLOPROS modelling approach

This section contains a brief description of the coastal protection standards estimated with the FLOPROS modelling approach. Higher protection standards can be found at regions with high economic activity and high asset exposure. Regions with low risk have lower estimated protection standards. Regions without modelled risk in the GLOFRIS model are excluded. This occurs in regions where we have no data on exposure or no coastal inundation is simulated. These protection standards are used in our paper as the current protection, on top of which the future costs of dike heightening are calculated. The protection standards for The Netherlands are manually set to 1000-year return period. This is because, for whole of The Netherlands protection standards are known to be higher than 1000-year return period.

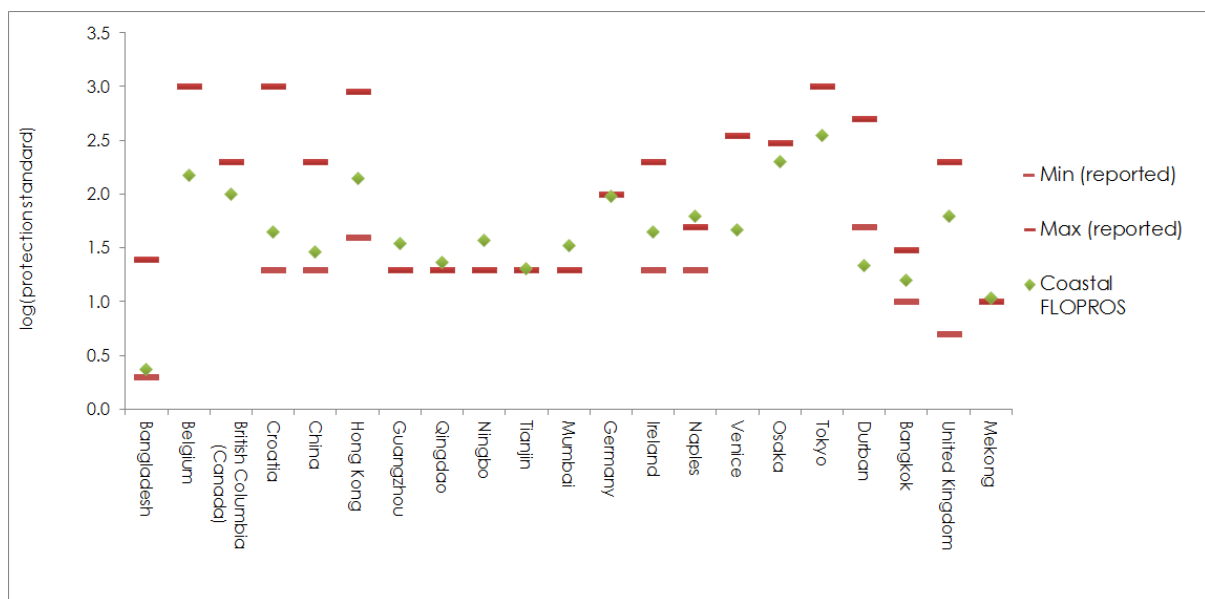


Figure S1: Validation of the coastal protection standards estimated using the FLOPROS modelling approach against reported protection standards.

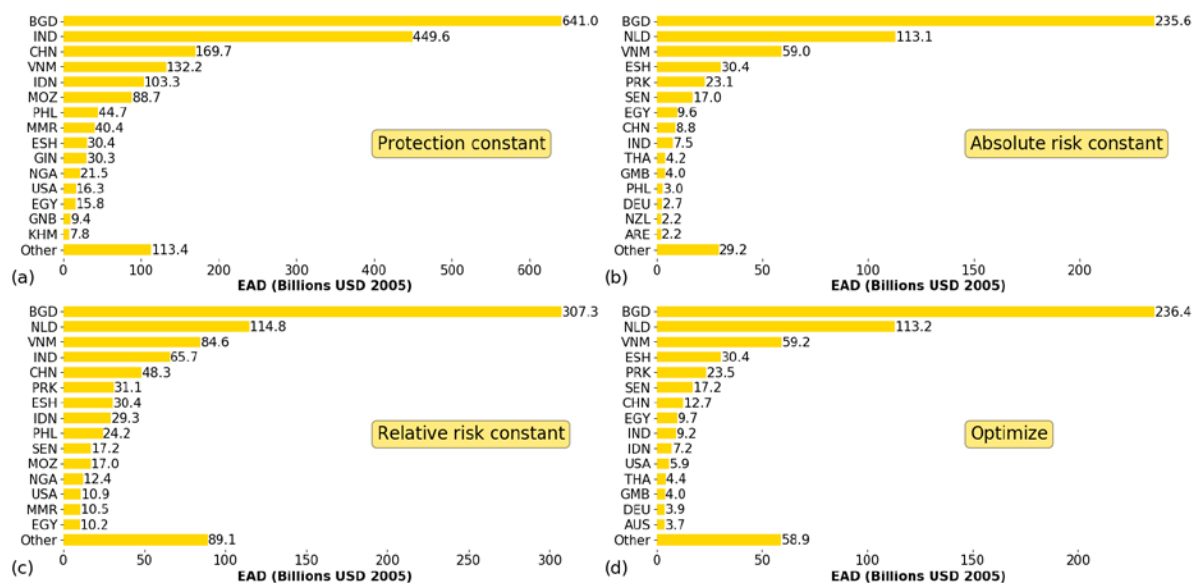


Figure S2: Top 15 countries with coastal flood risk in (a) 2080 if protection standards are kept constant, (b) 2080 if absolute risk is kept constant, (c) 2080 if relative risk is kept constant, and (d) 2080 if protection standards are optimized for the scenario RCP8.5–SSP5. Note that the countries and value on the x axis change for each graph. The countries are denoted by ISO 3166-1 alpha-3 codes

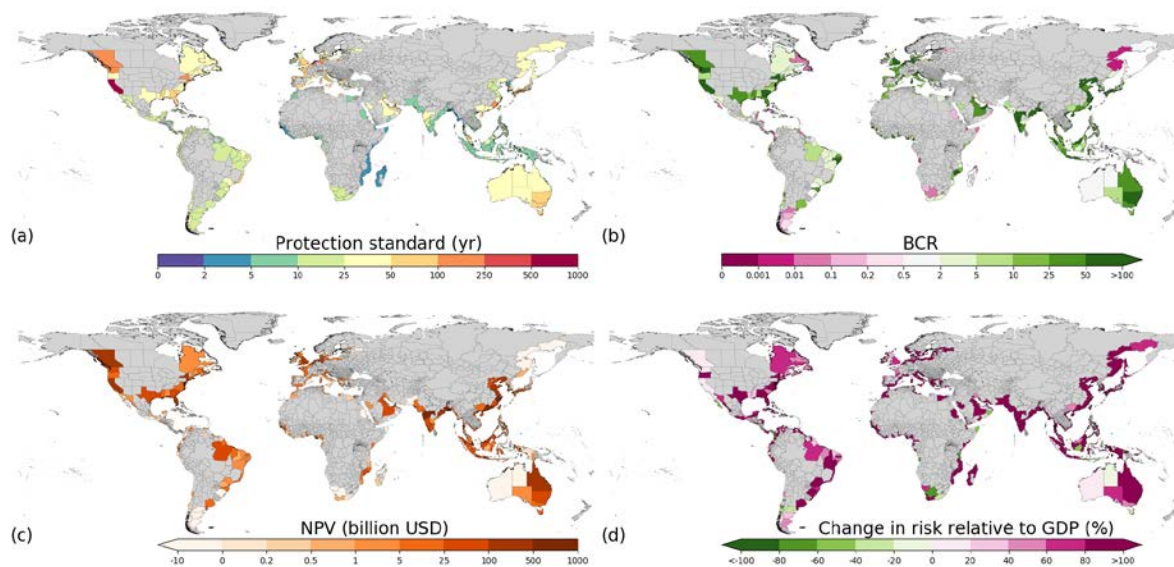


Figure S3: Protection constant adaptation objective results of (a) protection standards, (b) BCRs, (c) total NPV, and (d) change in risk relative to GDP for RCP8.5–SSP5. Note that the protection standards (a) are the same as FLOPROS estimates. Regions with no data are indicated in grey.

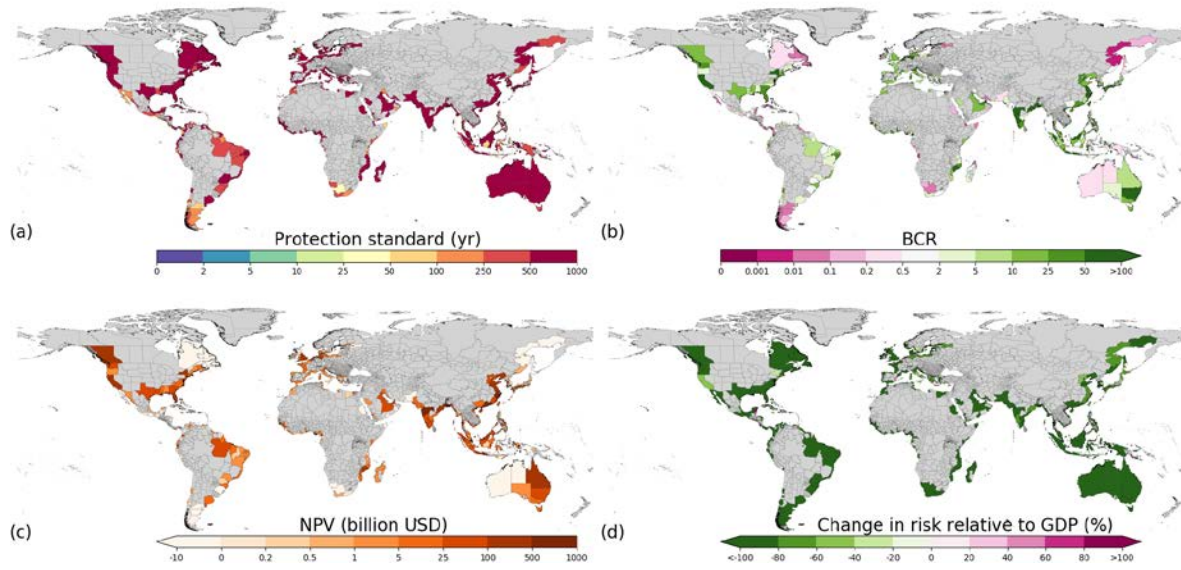


Figure S4: Absolute-risk-constant adaptation objective results of (a) protection standards, (b) BCRs, (c) total NPV, and (d) change in risk relative to GDP for RCP8.5-SSP5. Regions with no data are indicated in grey.

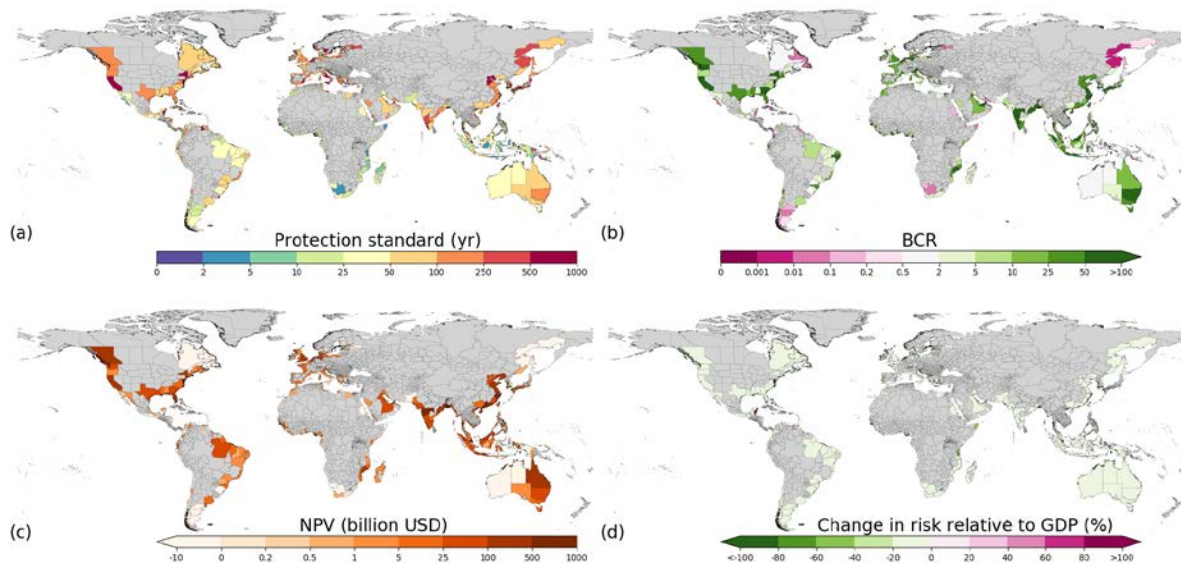


Figure S5: Relative-risk-constant adaptation objective results of (a) protection standards, (b) BCRs, (c) total NPV, and (d) change in risk relative to GDP for RCP8.5-SSP5. Regions with no data are indicated in grey.

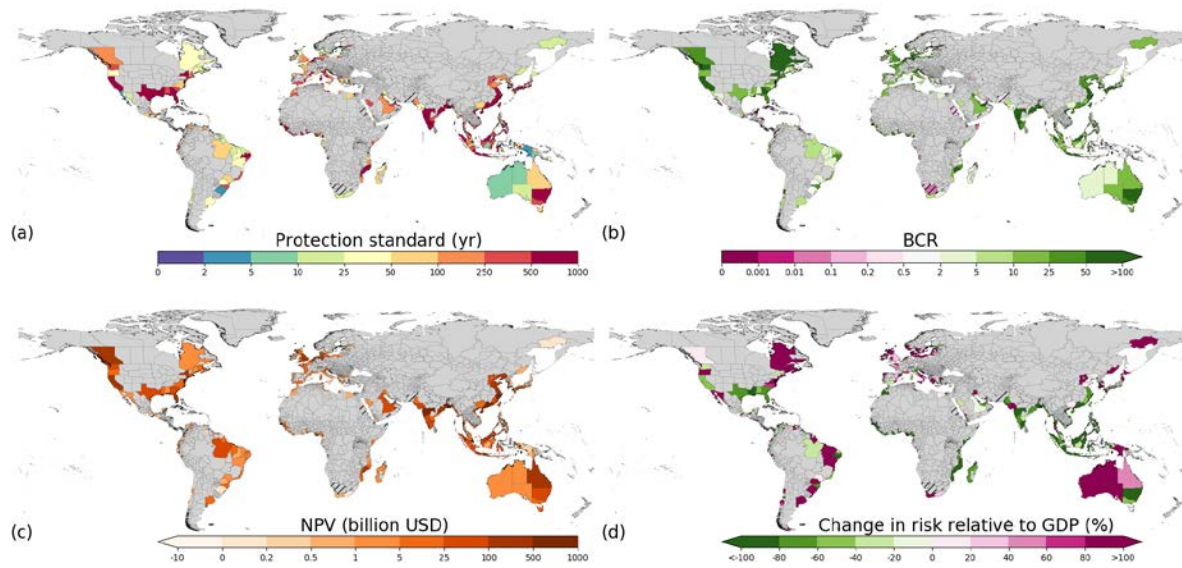


Figure S6: Optimize adaptation objective results of (a) optimal protection standards, (b) BCRs, (c) total NPV, and (d) change in risk relative to GDP for RCP8.5–SSP5. Regions where no optimal protection standards are found are indicated with hatched lines, and regions with no data are indicated in grey.

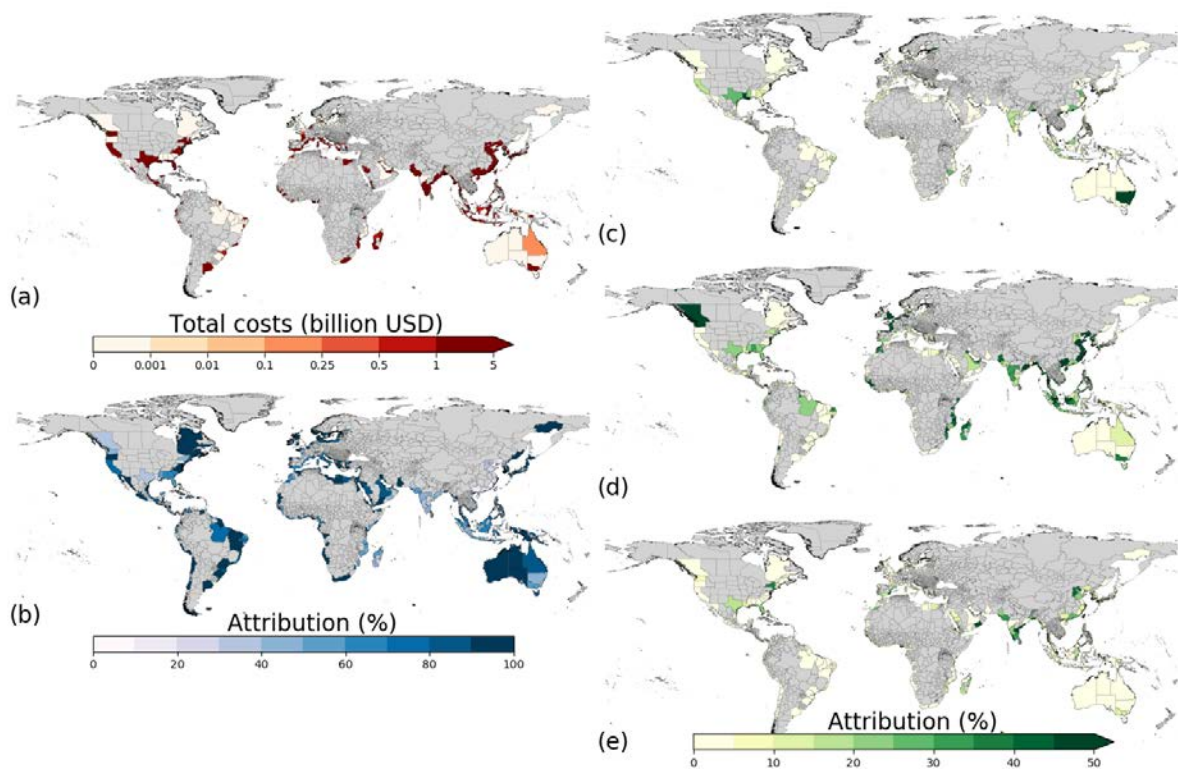


Figure S7: Attribution of costs overview for RCP8.5–SSP5, with (a) total costs, (b) attribution of sea-level rise (ATR_{SLR}), (c) attribution of current optimizing (ATR_{CUR}), (d) attribution of socioeconomic change (ATR_{SEC}), and (e) subsidence (ATR_{SUB}). Note that the attribution of SLR is on a different scale, and regions with no data are indicated in grey.

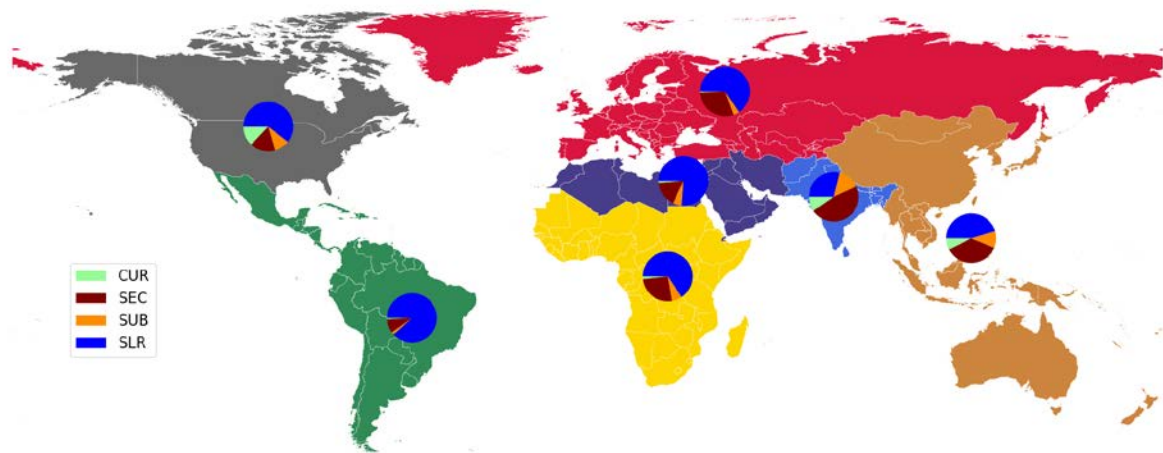


Figure S8: Attribution of costs of adaptation for World Bank regions under the optimize adaptation objective and RCP8.5-SSP5 for optimizing to current conditions (CUR), socioeconomic change (SEC), subsidence (SUB), and sea-level rise (SLR).