

Low-end probabilistic sea-level projections

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Abstract: In the area of sea-level rise, recent research has focused on assessing either likely or high end future sea levels, but less attention has been given to “low-end” sea-level projections, exploring best-case potential sea-level changes and providing the basis for estimating minimum adaptation needs. Here we provide global and regional probabilistic sea-level projections using conservative projections of glaciers and ice-sheets melting and a selection of models from the Coupled Model Intercomparison Project phase 5 (CMIP5) delivering moderate thermal expansion. Our low-end sea-level projections are higher than previously estimated because they rely on modeling outcomes only, and do not add any expert judgement, aiming essentially at delivering more realistic upper tails. While there are good reasons to believe that our projections are excessively optimistic, they can be used as low-end sea-level projections in order to inform users with low aversion to uncertainty. Our low-end sea-level projection exceeds 0.5m along most inhabited coasts by 2100 for business as usual greenhouse gas emissions (RCP8.5), which is relevant for adaptation practitioners as long as efficient climate change mitigation policies are not implemented. This means that without efficient climate mitigation, an acceleration of sea-level rise can hardly be avoided during the 21st century.

Keywords: sea-level rise; projections; probabilistic.