

Estimating the influence of sea level rise uncertainty on future sea level rise projections

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Semi-empirical methods have been prominently employed in the last few years to project future sea level change. The projections range between 20cm (the lower limit of the Intergovernmental Panel on Climate Change, IPCC 4th assessment report) and 210cm. This range is caused both by the uncertainties in the response of sea level to a given surface temperature change, but also due to uncertainties related to the reconstruction of the past sea-level and on the implementation of the uncertainty in the semi-empirical models. In the study presented here we focus on how errors in the past sea level reconstructions affect future sea level projections. We use the Church and White data set and its associated errors as well as a sea level reconstruction for 1900-2010 computed at the University of Colorado. We study the uncertainty introduced by semi-empirical models due to the estimated error in the initial sea level time series and how it affects the projections of future sea level. We compare the semi-empirical projections to extrapolations and discuss how extrapolations may be the better-suited method for short-term projections (<10 years). In addition we attempt to estimate the time period over which our sea level projections are valid. In addition, the semi-empirical model used in this study is sensitive to the initial sea-level reconstruction used to train the model. It is therefore essential that we obtain a better understanding of the errors in the current observations in order to select the most realistic initial conditions.