



## Using proxy data to calibrate a semi-empirical sea-level model

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A major challenge of climate science is the prediction of global sea-level rise. Since it involves a variety of complex processes it is not easy to capture all of them in process-based models. In this light semi-empirical models evolved, exploiting the observed connection between global temperature and mean sea level.

By explicitly resolving the relaxation timescale of sea level to a disturbance in temperature we can calibrate our model over time periods of thousands of years. Therefore we need high resolution proxy sea-level data as well as temperature proxy reconstructions.

The number of high-resolution sea-level proxy data lags behind that of temperature proxy reconstructions, but in recent years more sea-level proxy series have become available, especially in the northwestern Atlantic – mostly won from salt-marsh records. Besides an analysis of single components of sea-level rise, this allows a better approximation of global-mean sea level over long times, which is needed for semi-empirical modelling. Calibrating our model with a synthesis of several sea-level proxies and different available temperature proxy reconstructions helps to improve projections of future sea-level rise and constrain their uncertainties.

Moreover, calibrating the model with proxy and instrumental data up to 1900 AD we can show that useful predictions for the 20th Century can be obtained, despite the rates of rise there being outside the range found during the calibration period. For a direct comparison with IPCC projections we also calibrate our model until 1961 AD and project the subsequent rise up to 2003.