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Assessing sea-level change of the last 300 years using tide gauge and proxy records

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Detailed sea-level budgets are now available for the 20th and 21st centuries, but separating the differing contributions of sea-level rise prior to 1900 remains difficult, in part due to additional temporal and vertical uncertainties associated with proxy records, and the spatially variable nature of driving processes.

We present tide gauge and proxy reconstructions of sea level since 1700, and analyse their structure using Gaussian process modelling which allows for continuous reconstructions with fully quantified uncertainties. This enables the timing of accelerations, magnitude and rates of change to be determined, and in turn enables site-specific sea-level budgets to be derived. The contribution of different driving mechanisms (e.g., glacio-isostatic adjustment and steric changes) for each site is assessed, and the evolution of the barystatic contribution for the last 300 years is evaluated.