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Local sea level trends, accelerations and uncertainties over 1993-2019

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Satellite altimetry missions provide a quasi-global synoptic view of sea level variations over more than 25 years and provide regional sea level (SL) indicators such as trends and accelerations. Estimating realistic uncertainties on these quantities is crucial to address current climate science questions. While uncertainty estimates are available for the global mean sea level (GMSL), information is not available at local scales so far. We estimate a local satellite altimetry error budget and use it to derive local error variance-covariance matrices, and estimate confidence intervals on trends and accelerations at the 90% confidence level. Over 1993–2019, we find that the average local sea level trend uncertainty is 0.83 mm.yr^{-1} with values ranging from 0.78 to 1.22 mm.yr^{-1} . For accelerations, uncertainties range from 0.057 to 0.12 mm.yr^{-2} , with a mean value of 0.062. We also perform a sensitivity study to investigate a range of plausible error budgets.

A dataset consisting of a single NetCDF file containing local error levels, error variance-covariance matrices, SL trends and accelerations, along with corresponding uncertainties is provided (<https://doi.org/10.17882/74862>). Code to reproduce the study is also distributed (<https://github.com/pierre-prandi/rsl>). With this information, users should be able to reuse these error levels to derive uncertainties on any metric (e.g. inter annual variability) or time period.