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The discrepancy between the sea level recorded at Brest and Newlyn analysed by the Singular Spectrum Analysis.

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Tide gauge records provide crucial information about sea level rise in coast areas, however, there are several problems in using long-term time series. The tide gauge records are affected by undesired events such as spikes, gaps and time shifts, due to natural or anthropogenic activity. The presence of these instrumental failures makes difficult the investigation of the low frequency sea level variations. Identifying and filling gaps in the records results in the longer data sets, allowing the study and discrimination of long-term components. Here, we apply advanced Monte Carlo Singular Spectrum Analysis (MC-SSA) to separate statistically significant components (trends and oscillations) from noise and define the main time scales of variability in time series. The information about the main oscillations is used for filling the gaps by the method of Kondrashov and Ghil (2006). Conventional linear interpolation will be replaced by statistical modelling using detected oscillations. This algorithm is used for analysis techniques to analyse the causes of inconsistency between Brest and Newlyn tide gauge records, in particular before and after the World War II years.