Cascais (Portugal) tide gauge data have been used in many relative sea-level studies as it spans more than 100 years. With the installation of a nearby GPS station (CASC) in 1996, it has now become possible to study the absolute sea-level rise at Cascais. That is, the sea-level rise with respect to the centre of the solid Earth. Such a computation has already been performed in the past but without good estimates of the trend uncertainty and we consider the published error values to be over optimistic. This research computes more realistic trend errors for the GPS and tide gauge trend by taking into account the temporal correlation that exists within the data. For GPS, this is nowadays a routine operation but hardly applied in tide gauge time-series analysis. One of the reasons for this is that the noise within the tide gauge data cannot be described by a simple Fractional-Integrated (FI) noise model, but requires a more elaborate Auto-Regressive Fractionally Integrated Moving Average (ARFIMA) noise model.

In addition to the error analysis on the GPS time-series, we analyze the time-series obtained using state-of-art mapping functions (GMF and VMF1) at different elevation angles. in order to investigate how much the selection of the mapping function together with the cut-off angle can affect the estimated trend and associated uncertainties. We compare our solution with other recent works that suggest large sea-level accelerations at CASC site. We show that the proper assessment of the associated uncertainties is fundamental to obtain such conclusions.