



Sea level rise hazard in exposed coastal urban areas of Portugal mainland

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Coastal areas are amongst the most dynamic systems. Flood and coastal erosion hazards are often present at the coastal zone together with human settlements high population density. This leads to high levels of exposure and vulnerability and to frequent damaging events affecting the coastal population, infrastructure and assets that will be amplified by mid- to long-term expected sea level rise (SLR). This research aims to delimitate the coastal hazard zones due to SLR in the Portuguese mainland and for future emission scenarios in 2040, 2070 and 2100. It aims also to assess the possible impacts on the built environment by predicting land use land cover (LULC) changes based on the recent past coastal urban area's evolution.

The two-step methodology includes: a) identification of the SLR hazard zones (SLRHZ) based on the biophysical classification of coastal systems, on the 2040, 2070 and 2100 projected maximum high tide line of equinoctial living waters for the 2.7, 4.5 and 8.5 shared socioeconomic pathways (SSP) scenarios, added with the expected levels of storm surge and run up, and on the maximum expected coastline retreat for the same scenarios; b) assessment of the coastal zone built environment changes through recent LULC dynamics (1995 – 2018) and scenario modelling for the reference years and SSP taking into account present day land use planning restrictions.

Preliminary results show: (i) high dependence of SLRHZ on the type of coastal system, (ii) high regional/local contrast on the expected extent of the SLRHZ, mainly when considering the areas exposed to coastline retreat, wave overtopping and overwash; (iii) relatively low impacts of the permanent flooded areas due to SLR in the built environment; (iv) a steady rise in the built environment in the coastal area and consequently in the exposed elements in the SLRHZ; and (v) an increase in the exposed urban areas in the upcoming years according to the assumed scenarios.

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