COASTAL EROSION IN BEACHES OF THE COAST OF BUENOS AIRES, ARGENTINA

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Abstract. By using a simple and highly diffused model such as Bruun rule, a projection for the recession of the coastline was estimated along the entire maritime coastline of the province of Buenos Aires. For this, the sea levels corresponding to the 2045 and 2100 horizons were considered under the climate change scenarios RCP 4.5 and 8.5. By 2045, the calculated mean coastline recession values over the entire study area were 17.8 m (RCP 4.5) and 19.6 m (RCP 8.5). For the year 2100, mean recession values of 47.4 m (RCP 4.5) and 69.7 m (RCP 8.5) were obtained. The highest values of coastal recession were estimated in the coastal section between the districts of Pinamar and General Pueyrredón.

Keywords: Bruun rule, mean sea level rise, climate change scenarios.

Methods

The Bruun rule (1962) was used, which determines erosion due to changes in sea level and depth of closure.

$$R = S\frac{L}{B+h}$$

R: coastline recession (m).
S: sea level rise (m).
L: beach profile length (m).
B: dune height (m).
h: depth of closure (m; Hallermeier, 1981).

- Mean sea level rise for 2045 and 2100 horizons corresponding to the climate change scenarios RCP 4.5 and RCP 8.5 (IPCC, 2014) were considered (Figure 1).

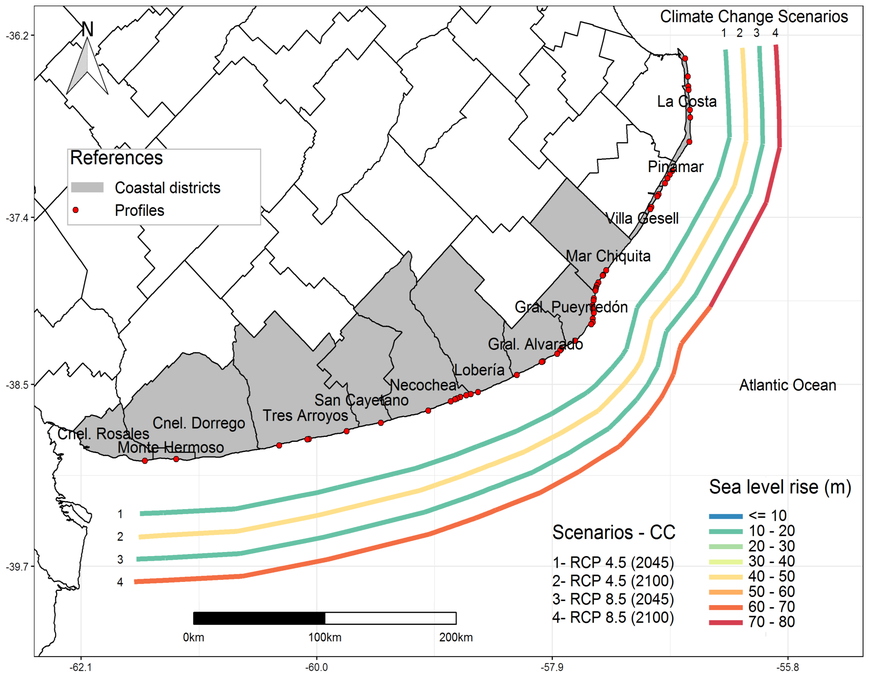

Figure 1. Mean sea level rise for the 2045 and 2100 horizons under different climate change scenarios.

Results

Figure 2 summarizes the results obtained in this work.

- By 2045, the calculated mean recession values of the coastline were 17.8 m (RCP 4.5) and 19.6 m (RCP 8.5).
- For the year 2100, mean recession values of 47.4 m (RCP 4.5) and 69.7 m (RCP 8.5) were obtained.
- The section with the highest values of coastal recession is the one between the districts of Pinamar and General Pueyrredón.

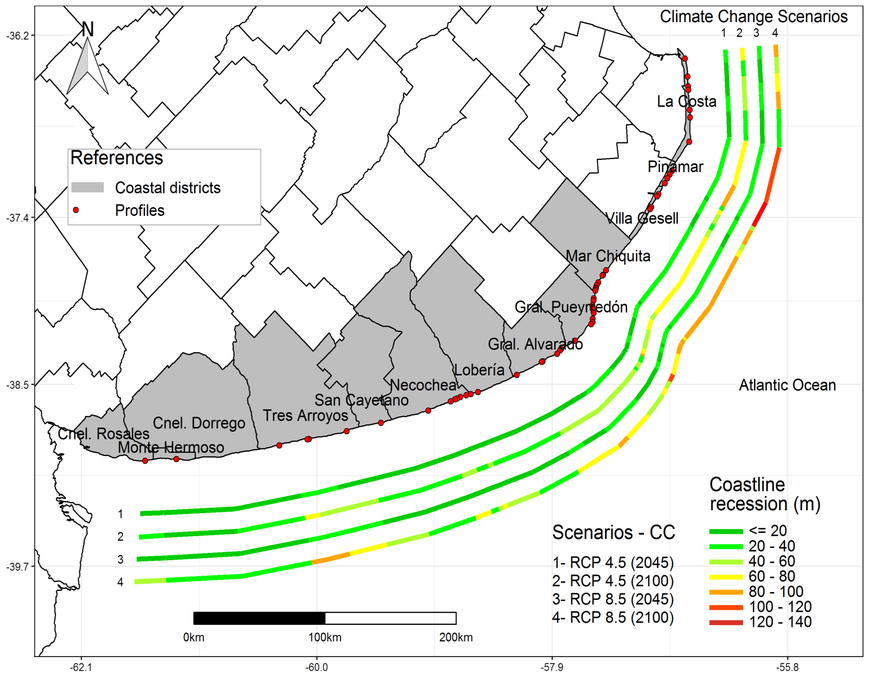

Figure 2. Coastline recession for the 2045 and 2100 horizons under different climate change scenarios.

Conclusions

- The Bruun model was helpful to identifying the areas of the coast of Buenos Aires that will potentially be most affected by the rise in mean sea level for horizons 2045 and 2100.
- This future diagnosis of the problems provides useful information that allows think about the development of a comprehensive management plan aimed at protecting coastal resources.

Bibliography

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