Coastal Risk Analysis of the Black Sea Under the Sea Level Rise

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SUMMARY

Recent studies demonstrate that global mean sea level rise is accelerating since the mid-21st century associated with thermal expansion and the melting of glaciers and ice sheets. It means that low-lying areas will tend to be inundated more frequently. Also, the sea level rise is causing many problems, such as coastal erosion, destructive storms, and the movement of saline water into fresh water. Moreover, the variations in sea level differ from the global to regional due to local environment, changes in ocean circulations and regional hydrology, etc. So, it is important to monitor sea level changes, particularly in denser population regions. The Black Sea is a nearly closed sea having limited interaction with the Atlantic Ocean through the Turkish Straits and the Strait of Gibraltar. So, monitoring of Black Sea level changes is important in terms of coastal risk assessment and coastal management planning, etc. The past measurements of both tide-gauges and satellite altimetry have revealed that the mean sea level of the Black Sea has risen rapidly. In this study, it aims at modeling and predicting shoreline change and its impacts on the Black Sea coasts using the bathymetry data. This study has shown that the Black Sea coasts – particularly the low-lying delta plains such as Carşamba and Bafra – are highly vulnerable to the coastal erosion and inundation. Therefore, the possible consequences of sea level rise should take into account in the coastal management.