

Effect of climate change on the shoreline at Udupi, India

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The configuration of a shoreline continuously undergoes changes either due to the effect of natural processes or because of human interventions. Concerns have been raised since recent past of additional effects because of the climate change induced by global warming. The prediction of the rate of shoreline shifts as well as that of erosion and accretion over future considering the impact of climate change is done in this work at a location called Udupi along the west coast of India. Historic satellite imageries are compiled to determine the shoreline change rate for the past 35 years. Wave data are generated for past and future 35 years using a numerical model (Mike21-SW) forced by wind from a high resolution regional climate model: CORDEX, with a spatial resolution of $0.44^{\circ} \times 0.44^{\circ}$ and run for a moderate pathway of global warming: RCP 4.5. The output from the wave model formed the input to the shoreline evolution model: LITPACK, which simulated the erosion/accretion and shoreline shifts for past 35 years as well as future 35 years. The results indicate that at this site the wind and wave activity will significantly increase in future. The probability of getting higher waves in future could increase with corresponding reduction in the occurrence of lower waves. The area under consideration presently undergoes high erosion and this would intensify in future. As against the past rate of erosion of +0.11 to -1.46 m/year the future rate would be -1.67 to -2.21 m/year. The volume of total sediment transport will also substantially increase over the future. This study highlights the importance of predicting changes in shorelines at a given location considering the impact of the climate change induced by global warming.