THE IMPACT OF METEOROLOGICAL AND OCEANOGRAPHIC FACTORS ON SEA LEVEL RISE IN THE US-GULF OF MEXICO

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Abstract: Sea level rise in the coastal regions of the US- Gulf States are undergoing a significant change from 1985 to 2015. The 1985-2015 period was selected to analyze the past three decades of current available data. In this study five southeastern states of TX, LA, MS, AL, and FL were analyzed using meteorological and oceanographic data from the NOAA (National Oceanic Atmospheric Administration) tide gauge database. Twenty stations were used to represent the five states. The data were exported to Microsoft Excel, for subsequent rearrangement by stations among states to evaluate variability among states. The data were analyzed using SAS 9.4 to determine the variations in the sea level rise and the relationship between meteorological and oceanographic. Results indicated a significant increase (p<0.05) in the past 15 years and a linear trend of 4.2 mm/year. The average seasonal sea level cycle has an up and down trend characterized by a high peak in October and low rate in the winter months. Among the US-Gulf states, LA is significantly different (p<0.05) with higher relative sea level rates. The main factors contributing to local and temporal sea level rise are geophysical and oceanographic forces. Water temperature, air temperature, and barometric pressure had a combined 10% impact on mean sea level rates ($R^2 = 0.095$).

Keywords: Gulf of Mexico, Meteorological, Oceanographic, Sea Level Rise, Tide Gauge

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