

Sea-Level Rise and Shoreline Retreat in Tainan Coast

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Abstract : Tainan coast is suffering from beach erosion, wave overtopping, and lowland flooding; though most of the shoreline has been protected by seawalls, they still threatened by sea level rise. For coastal resources developing, coastal land utilization, and to draft an appropriate mitigate strategy. Firstly; we must assess the impact of beach erosion under a different scenario of climate change. Here, we have used the meteorological data since 1898 to 2012 to prove that the Tainan area did suffer the impact of climate change. The result shows the temperature has been raised to about 1.7 degrees since 1989. Also, we analyzed the tidal data near the Tainan coast (Anpin site and Junjunn site), it shows sea level rising with a rate about 4.1~4.8 mm/year, this phenomenon will have serious impacts on Tainan coastal area, especially it will worsen coastal erosion. So we have used Bruun rule to calculate the shoreline retreated rate at every two decade period since 2012. Wave data and bottom sand diameter D50 were used to calculate the closure depth that will be used in Bruun formula and the active length of the profile is computed by the beach slope and Dean's equilibrium concept. After analysis, we found that in 2020, the shoreline will be retreated about 3.0 to 12 meters. The maximum retreat is happening at Chigu coast. In 2060, average shoreline retreated distance is 22m, but at Chigu and Tsenwen, shoreline may be backward retreat about 70m and will be reached about 130m at 2100, this will cause a lot of coastal land loss to the sea, protect and mitigate project must be quickly performed.

Keywords : sea level rise, shoreline, coastal erosion, climate change

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