

HYDRAULIC APPROACH TO SHORELINE CHANGE DUE TO SUBMERGED BREAKWATER

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ABSTRACT

The littoral drift cell of the beach includes Gungchon Beach, Wonpyeong Beach, and Munam Beach, located in Samcheock-si, South Korea, and it ranges from northern Gungchon harbor to southern Chogok harbor. Owing to the construction of Gungchon harbor in 2006, sand from the southern Wonpyeong Beach was moved to the northern Gungchon Beach, which resulted in the retreat of the shoreline by an average of over 50 m. Even though the government implemented an erosion prevention project via submerged breakwaters, beach erosion is still occurring continuously in nearby areas. In this study, the construction of submerged breakwaters from 2013 to 2014 is monitored to analyze the tendency of sand transport. The items of investigation include wave induced current, wave height, beach profile, shoreline change, etc. The investigation has been performed seasonally. After the construction of submerged breakwaters, a tombolo was generated behind the submerged breakwaters. This caused beach erosion in the nearby areas. Rip currents are mainly generated near submerged breakwaters, which plays a role in the transportation of sand in the offshore direction. In order to analyze the sand movement, numerical analysis was conducted. The analysis indicated that a strong rip current is generated near submerged breakwaters. Thus, Wonpyeong Beach was eroded due to the construction of Gungchon harbor in 2006 while Gungchon Beach was accreted. The government is trying to establish a countermeasure by using submerged breakwaters. However, other erosions were found near the construction area. Therefore, this study concludes that detailed monitoring during and after the construction is necessary to predict possible second erosion as well as to understand the erosion mechanism for design purposes.

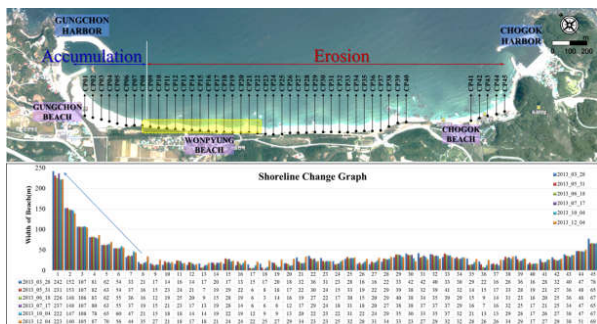


Figure 1 - Shoreline Change in Wonpyung Beach and Chogok Beach, Gangwon-do

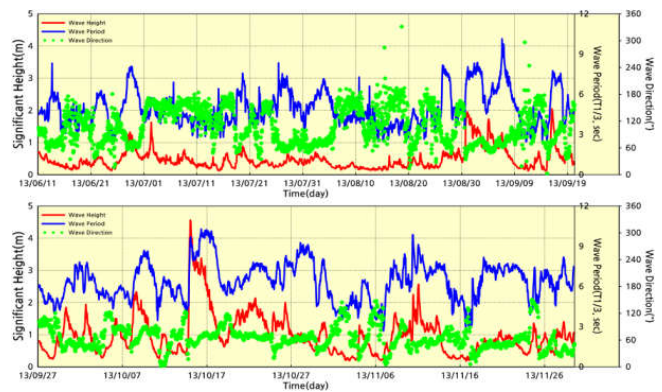


Figure 2 - Wave Height and Wave Direction

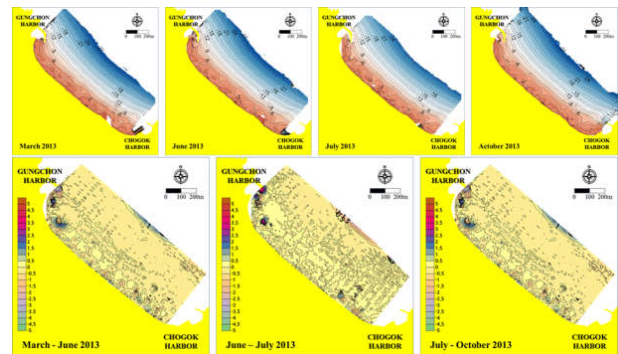


Figure 3 - Bottom Topography Map

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