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Comparative Study of the Characteristics of Annual Maximum Surge Heights along the Eastern and Southern Coasts of Korea

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There has been growing interest in how the storm surge height is changing due to typhoons associated with global warming. During the past 56 years, the number of typhoons affecting on the Korean Peninsula (KP) was about 3.3 per year, and approximately one of them made landfalls over the KP. The intensity of the KP-landfall typhoons is increasing continuously, which produces more severe damages in Korea. In 2003, the typhoon Maemi (2003) produced 85 deaths and total property damage of about 5 billion US dollars. This study investigates and compares the characteristics of the long-term variation of the annual maximum surge heights (AMSH) in the eastern and southern coasts of Korea, focusing on the global warming and the resultant change of typhoon and storm surge intensity. The used data are the sea level records at Sokcho, Mukho, Pohang, Ulsan, Busan, Tongyoung, and Yeosu along the KP coasts over 34 years. In this study, the hourly surge data at 7 tidal stations are constructed through the tide filtering and data corrections.

Based on the linear regression, it is found that the long-term uptrends in the AMSH of the eastern coast are 8.3cm/34yrs at Sokcho, 8.7cm/34yrs at Mukho, 12.1cm/34yrs at Pohang, and 9.9cm/34yrs at Ulsan, while those in the southern coast are 11.2cm/34yrs at Busan, 33.6cm/31yrs at Tongyoung, and 34.5cm/34yrs at Yeosu, which are relatively higher than those in the eastern coast. It is also seen that the average and maximum values of AMSH in the southern coast are obviously higher than those in the eastern coast. The statistical analysis reveals that the 53% of the AMSH in eastern coast and the 68% of the AMSH in southern coast occur during the typhoon period. It is shown that the uptrend in the AMSH seems to be attributed by the increased intensity of typhoon that influences the KP with climate change. The continuous efforts monitoring and predicting the extreme surge events in the future warm environments will be required to reduce the growing storm surge damage by the intensified typhoon in Korea.