

Validity Verification in Typhoon Disaster Prevention Model for Typhoon Damage Reduction –GUST Wind Speed, Maximum Wind Speed -

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In recent years, as the intensity of typhoons affecting the Korean peninsula has become stronger due to global warming resulting from climate change, studies on typhoons attacking the Korean peninsula are being increasingly carried out. Many previous studies have constructed typhoon disaster prevention models for estimating the maximum wind speed of the 3-second gust that can occur during a typhoon. In addition, such studies have enabled the establishment of foundational materials for the typhoon disaster prevention system. However, there have been few studies on the validity of the maximum possible wind speed of the 3-second gust, as estimated by the typhoon disaster prevention model. Therefore, in this study, validity analysis was carried out via verification using the observed 3-second gust values. For the verification, the GUST wind speed data from marine meteorological buoys (which serves as the basis of maximum wind speed) monitored by the Korea Meteorological Administration, and maximum instantaneous wind speed data from lighthouse observation, were used. In addition, this study compared and analyzed the 3-second gust values observed at points located within the radius of the maximum wind speed, and at points located outside the radius of the maximum wind speed during the typhoon season. The points within the radius of the maximum wind speed showed a more similar trend to the observed values than the points outside the radius. In addition, the points within the radius better simulated the maximum wind speed. Moreover, the 3-second gust values calculated by the typhoon disaster prevention model were slightly greater than the observed values at almost all points. From the viewpoint that the calculated value is the maximum possible wind speed, it is considered to provide useful information in terms of pre-disaster prevention regarding typhoon damage. As a result of comparing the wind speeds at the 10 m altitude (which were obtained from the typhoon prevention model by categorizing the Korean peninsula into inland, coastal, and island regions), with the observed values, the island region, showed the best results (due to the presence of fewest obstacles on the ground), followed by the coastal, and inland regions. This study suggests that the 3-second gust is a justified parameter to be used in the typhoon disaster prevention model. Therefore, the typhoon disaster prevention model can be efficiently applied to the typhoon disaster prevention system.

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