# UNCERTAINTY ASSESSMENT OF FUTURE CHANGE PROJECTION TO TYPHOON PROPERTIES AND MAXIMUM STORM SURGE HEIGHT DEPENDING OF FUTURE SEA SURFACE TEMPERATURE AND GREENHOUSE GAS EMISSION SCENARIOS

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## INTRODUCTION

In order to evaluate the future storm surge risk at the national scale, it is necessary to evaluate typhoon characteristics for a country-specific in prior to conducting storm surge simulation using them. When projecting future changes of tropical cyclones (TC) by using the atmospheric general circulation model (AGCM), there are several uncertainties due to model resolution, model physics parameterization, given sea surface temperature (SST) under future climate condition, and global warming scenarios. The uncertainties stemming from physics and numerical modeling configuration can be reduced by improving the accuracy of AGCMs, while those from the global warming scenario and future SST condition are unable to be. This study assessed uncertainties in projecting future change to typhoon properties such as tracks, frequency and intensity and extreme storm surge height (SSH) depending of future SST and greenhouse gas emission scenarios.

## CLIMITE EXPERIMENTS AND TYPHON DATA

To evaluate the effects of the future SST change patterns and greenhouse gas emission scenarios on the projection of future SSHs, the output of climate experiments with four SST conditions and three global warming scenarios was used. Typhoon data, which were extracted from the results of each ensemble experiment by applying the TC detection technique, was employed to project the future SSHs around the KP. This study focused on typhoons passing around the KP which is defined as the region of 122°E - 132°E and 32°N - 40°N.

## FUTURE CHANGE OF TYPHOON PROPERTIES

It was expected that the number of the typhoons declined with a range from 4 % to 73 % while their intensity gathered strength in the range of 0.8 % to 1.3 %. Additionally, it is anticipated that there is no significant change in the trend of typhoon paths, but the locations of genesis and lysis of the typhoon moved to the northwest and the northeast, respectively (Figure 1). The scale of each change was expected to vary depending on applied SST conditions and global warming scenarios.

## FUTURE CHANGE OF STORM SURGE HEIGHT

The extent of future change of SSHs depended on the spatial pattern of SST and the global warming scenario (Figure 2). Those will affect the typhoon characteristics in the future climate condition, which accordingly change future SSH. Especially, the distributions of future change of maximum SSHs depending on the greenhouse gas emission scenarios show similar patterns, whereas the level of change is different. The uncertainty tends to increase as greenhouse gas emission increases, but it does not show similarity with respect to SST condition.

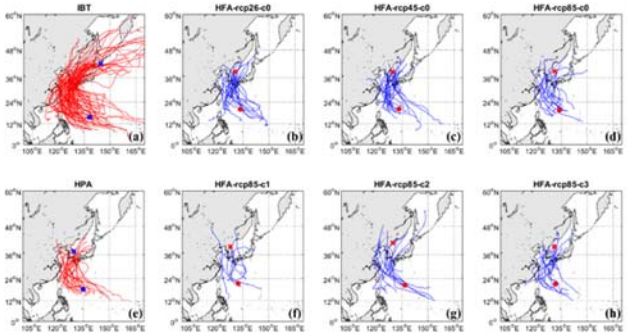


Figure 1 - Typhoon tracks of each climate experiment. The circle and the cross on each panel indicate the average location of typhoon genesis and lysis, respectively.

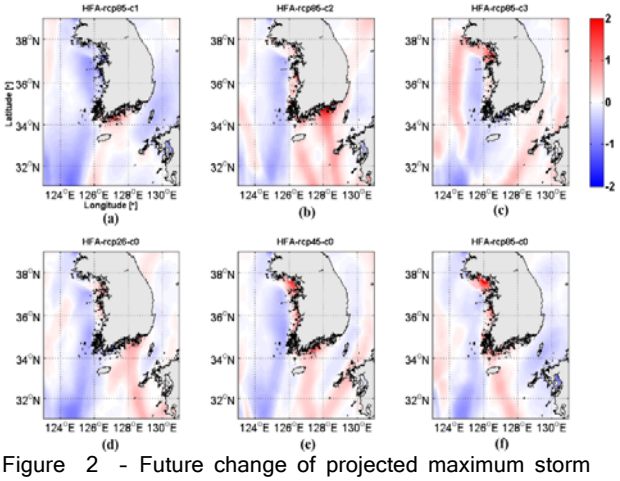


Figure 2 - Future change of projected maximum storm surge heights depending on each climate experiment [unit: m]

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