A new index for risk evaluation of complex disaster due to typhoons

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This study aims at investigating a new index to evaluate complex disaster risk in coastal zones involving typhoons. Typhoons generate not only strong winds but also storm surges and high waves. Therefore, complex disasters attributable to typhoon forces can be expected to occur in coastal zones.
We proposed simultaneous excess duration (SED): the durations for which the wind speed, storm tide, and wave height simultaneously exceed their respective design values were calculated as an index of risk evaluation of a complex disaster due to typhoon. To verify the utility of SED, numerical simulations were conducted for intensified typhoons under both present-day and global warming climates in Ise Bay, Japan using an atmosphere-ocean-wave coupled model with a typhoon bogussing scheme.
Results showed that the middle part of Ise Bay is more dangerous from the standpoint of SED than the inner part of Ise Bay, which has been regarded as the most dangerous area from the standpoint of extreme values of storm tide. These results suggest that SED is important as an index of risk evaluation of complex disaster, and the risk of typhoon disaster should be evaluated not only from extreme values of storm tide but also from SED.
References:
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