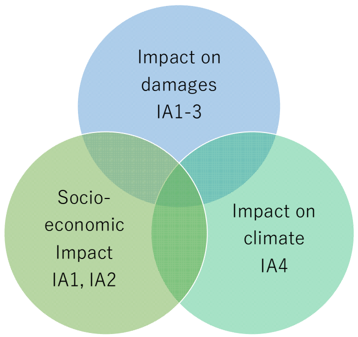
R&D Theme

Impact Assessment of Typhoon Control

Progress until FY2022

1. Outline of the project

We assess the impacts of the typhoon control on damage mitigation and on natural environments, which is necessary for establishing social acceptability. We develop models to estimate the effectiveness of the typhoon control on reduction in economic damages, which is a major part of the typhoon damages apart from human damage. We convert meteorological forces such as wind speed and rainfall into structural or other accessible damages. Then, we consolidate an integrated impact assessment model for wind and flood damages for typhoon control. A global atmospheric model is used to assess the secondary impacts on the environments in the east Asian countries. We are also analyzing the impact of typhoon control on other long-term socio-economic activities.

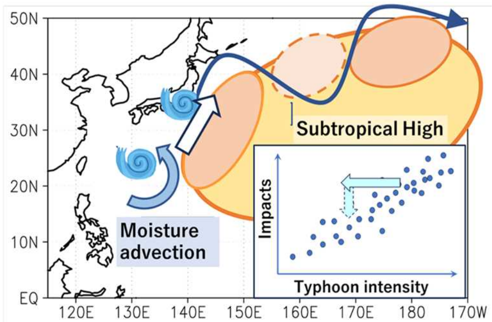


Outline of impact assessment group

2. Outcome so far

To estimate possible impacts of typhoon control on the natural environments, we analyzed large ensemble simulation data for Typhoon Faxai in 2019. Association of typhoon intensity near Tokyo with the distributions of western North Pacific subtropical high and moisture over the western North Pacific is confirmed.

For damage estimation, we developed a river flooding model to estimate the damage. In the river flooding simulations for the Typhoon Hagibis case, we reproduced inundation at a 99% capture rate among the 341 municipalities affected by the flooding. Development of strong wind damage and coastal flooding models on the town block and prefectural scales is also underway. Based on these research products, we are integrating a total impact assessment model for wind, river, and coastal flood damages by typhoon control.

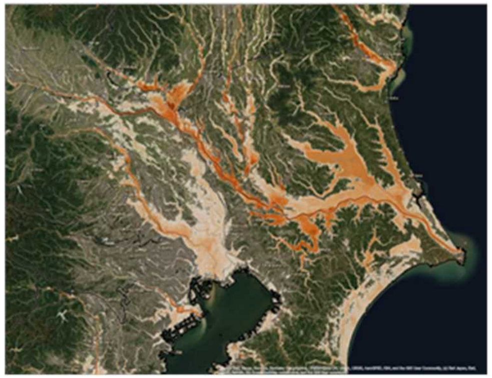


Possible impacts on the natural environment

Toward the assessment of the socio-economic impact, we organized expert meetings among disaster researchers to probe the range of the impacts, made business survey, and collected newspaper reports on past notable typhoons.

3. Future plans

We plan to extend the assessment of the impact of typhoon control on mitigation of the damages by sophisticating the individual models and by establishing the integrated impact assessment model, as well as comprehensive surveys (interviews, etc.) for the socio-economic impacts, and detailed analysis/simulations for the environmental impacts.



Results of inundation by TC Hagibis in 2019