

Estimating Worst Case Flood and Inundation Damages under Climate Change

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ABSTRACT

To generate information that contributes to climate change risk management, it is important to perform a precise assessment on the impact in diverse aspects. Considering this academic necessity, Japanese government launched continuous research project for the climate change impact assessment, and one of the representative project is Program for Risk Information on Climate Change (Sousei Program), Theme D; Precise Impact Assessment on Climate Change (FY2012 ~ FY2016). In this research program, quantitative impact assessments have been doing from a variety of perspectives including natural hazards, water resources, and ecosystems and biodiversity. Especially for the natural hazards aspect, a comprehensive impact assessment has been carried out with the worst-case scenario of typhoons, which cause the most serious weather-related damage in Japan, concerning the frequency and scale of the typhoons as well as accompanying disasters by heavy rainfall, strong winds, high tides, high waves, and landslides. In this presentation, a framework of comprehensive impact assessment with the worst-case scenario under the climate change condition is introduced based on a case study of Theme D in Sousei program

There are approx. 25 typhoons annually and around 10 of those approach or make landfall in Japan. The number of typhoons may not change increase in the future, but it is known that a small alteration in the path of a typhoon can have an extremely large impact on the amount of rain and wind Japan receives, and as a result, cause immense damage. Specifically, it is important to assess the impact of a complex disaster including precipitation, strong winds, river overflows, and high tide inundation, simulating how different the damage of Isewan Typhoon (T5915) in 1959 would have been if the typhoon had taken a different path, or how powerful or how much damage it would cause if Isewan Typhoon occurs again in the future when the sea surface water temperature has risen due to climate changes (Pseudo global warming experiment). The research group also predict and assess how the frequency of “100-years return period” disasters and worst-case damage will change in the coming century. As a final goal in this research activity, the natural disaster impact assessment will extend not only Japan but also major rivers in Southeast Asia, with a special focus on floods and inundations.

Keywords: Climate change, Impact assessments, Natural disasters, Typhoons, Worst scenario, Probability

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