



Future populations at risk of flooding

S. Kanae (1) and Y. Hirabayashi (2)

(1) Department of Mechanical and Environmental Informatics, Tokyo Institute of Technology, Tokyo, Japan, (2) University of Yamanashi, Yamanashi, Japan

Flooding is one of the major risks anticipated to increase in association with anthropogenically induced climate change which is likely to intensify the global water cycle. In this study, daily discharge simulation by a relatively high-resolution (T106; about 1.1-degree) general circulation model under the A1B scenario was used to investigate future projections of population changes under risks of more frequent flooding.

Currently, historical disaster record showed that 20 to 300 million people per year are affected by floods that threaten both social security and sustainable development. Our results indicate that in the case of 3°C warming from the average of 1980-1999, approximately 300 million people could be at risk even in years of relatively low flooding; this number corresponds to the number of people affected in a devastating flood year at present. If the temperature increase is greater than 3°C, the flood-affected population would likely be even larger.

A Monte Carlo approach revealed that the population experiencing daily discharge higher than the 20C 100-year flood from 2091 to 2100 is in the top 35% of the ranges of possible population sizes (sum of the population in regions that were randomly selected from global land of the same area as the regions with flood discharge), while that in 1991-2000 was below 30% of the probable population sets. This result indicates that future flooding will occur more common in regions with high population densities.