

# **The analysis of future heavy rainfall characteristics in Hokkaido, northern Japan, using database for Policy Decision making for Future climate change (d4PDF)**

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In August 2016, 4 typhoons successively attacked Hokkaido region (Northern part of Japan) within 2 weeks. This event is the first time in several decades and caused severe flood disaster which led local government to consider flood risk associate with climate change and adaptation plans.

In this study, we analyzed characteristics of heavy rainfall events over river basins in Hokkaido region under historical and warmer climate conditions. This research used d4PDF (database for Policy Decision making for Future climate change) which consists of large ensemble climate data (historical climate: total 3000 years, 2K warmer climate: total 3240 years, 4 K warmer climate: total 5400 years). Dynamical downscaling (DS, downscale from 20 km to 5 km) was conducted using a regional climate model for annual maximum rainfall events detected from d4PDF.

The results of annual maximum rainfall of DS under historical climate condition and those of observation results have similar frequency and include many events which exceed the maximum recorded rainfall. Therefore, DS can be regarded as effective way to make many possible heavy rainfall patterns. The comparison between historical and warmer climate showed future change of heavy rainfall characteristics (rainfall amount, spatio-temporal distribution and cause of rainfall). The heavy rainfall amount increases under warmer condition. Spatiotemporal distribution of annual maximum rainfall is more concentrated under warmer climate. Rainfall becomes heavier in warmer climate regardless of the causes, however number of heavy rainfall events associated with tropical cyclone decrease in warmer climate. Because heavier and more concentrated rainfall causes increase of peak discharge and change of characteristics of flood damage, this change of rainfall characteristics must be considered for flood disaster adaptation plans.

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