

Mizuta, R., M. Nosaka, T. Nakegawa, H. Endo, S. Kusunoki, A. Murata, and I. Takayabu, 2022: Extreme precipitation in 150-year continuous simulations by 20-km and 60-km atmospheric general circulation models with dynamical downscaling over Japan by a 20-km regional climate model. *J. Meteor. Soc. Japan*, **100**, 523-532.

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Plain Language Summary: Continuous simulations from the middle of the 20th century to the end of the 21st century were performed using a high-resolution atmospheric global climate model with dynamical downscaling using a regional climate model over the region around Japan. Regardless of the emission scenario used, the global-mean relative increase in annual maximum daily precipitation (Rx1d) was roughly proportional to the increase in the global-mean surface air temperature (SAT). A similar correlation between Rx1d and SAT was seen also in the values averaged over the Japanese land area in the 20-km simulations after applying a 10-year running mean.

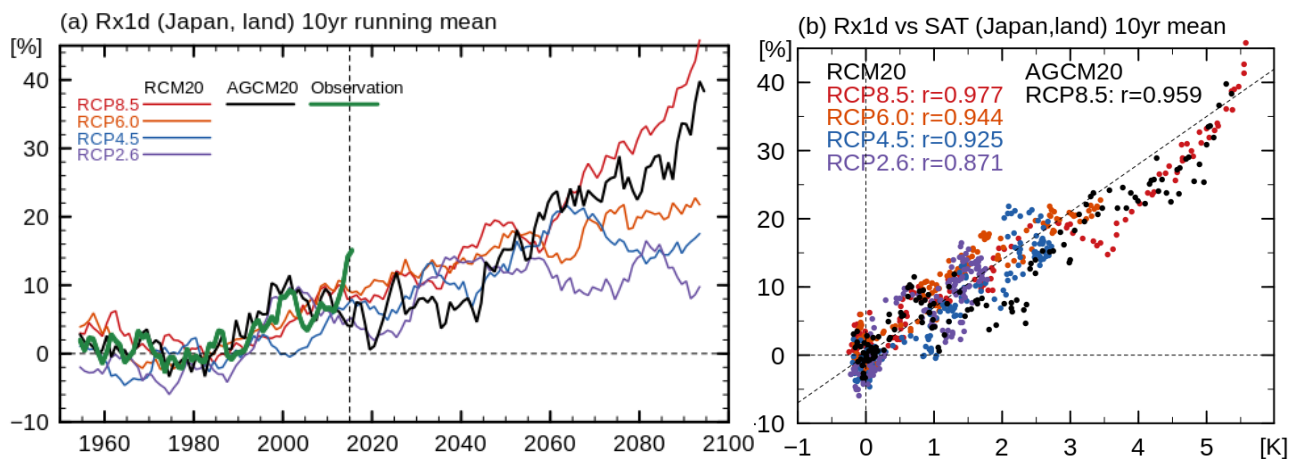


Figure 1. (a) Time series of the change relative to the 30-year average over the period 1950–1979 in the 10-year running-mean Rx1d averaged over the Japanese land grids, and (b) scatter plots of relative change in Rx1d (%) and SAT change (K) for the 10-year running mean values averaged over the Japanese land grids. The dashed line indicates a slope of 7% per degree.

- 150-year simulation with 20-km models allow us to analyze transitional changes caused by global warming in phenomena that require high-resolution simulations, such as extreme precipitation events.
- The models simulate the observed recent increase in Rx1d averaged over the Japanese land area.
- A clear correlation between Rx1d and SAT averaged over the Japanese land area is seen in the 20-km AGCM and the 20-km RCM future simulations.