Projected changes in extreme precipitation in a 60-km AGCM large ensemble and their dependence on return periods

*Ryo Mizuta[1], Hirokazu Endo[1]

1. Meteorological Research Institute

The dependence of projected changes in extreme precipitation on the return period, as well as on the temporal and spatial scales, is investigated using a large ensemble climate simulation with a 60-km resolution global atmospheric model. The rate of increase is noticeably larger for longer return values in most parts of the world. While thermodynamic contribution to this increase generally follows the Clausius–Clapeyron relationship for all return periods, dynamic contribution determines the dependence on the return periods. While the dependence on the temporal scales of precipitation has similar characteristics, that on spatial scales is not large. Composites for days with the 100-year return value show that upward motion is enhanced in the middle and upper troposphere, and is accompanied by the enhanced horizontal water vapor convergence below, suggesting that an increase in latent heat release due to the water vapor increase plays a significant role in the dynamic contribution.

Keywords: extreme events, global warming

