

Large ensemble high-resolution climate simulations –Application to Event Attribution study

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Recently, an unprecedentedly large ensemble of climate simulations with a 60 km atmospheric general circulation model and dynamical downscaling with a 20 km regional climate model have been released in Japan (the “Database for Policy Decision making for Future climate change [d4PDF]”) to assess probabilistic change in localized severe events that have large uncertainty from internal variability. Internal variability includes decadal variations in the ocean, inter-annual variability in the extratropical atmosphere, intra-seasonal variation in the tropics, and so on. Two sets of ensemble for past climate with and without historical trends associated with the anthropogenic effect, respectively, and an ensemble for 4 K warmer future climate are simulated more than 5000 years in d4PDF. Here, we will introduce our recent works using large ensemble simulations focusing on how much the inter-annual and decadal variability in the Pacific Ocean contributed to increased occurrence of heatwaves around the globe when compared to anthropogenic global warming.

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