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CHANGES IN PRECIPITATION OVER THE ARCTIC PROJECTED BY GLOBAL ATMOSPHERIC MODELS WITH 20-KM AND 60-KM GRID SIZES

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A set of global warming projections was conducted using global atmospheric models with high-horizontal resolution of 20-km (MRI-AGCM3.2S, the 20-km model) and 60-km (MRI-AGCM3.2H, the 60-km mode) grid sizes. For the present-day climate (1979-2003, 25 years), models were forced with observed historical sea surface temperatures (SST). For the future climate (2075-2099, 25 years), models were forced with future SST distributions projected by the models of the Fifth phase of Couple Model Intercomparison Project (CMIP5). The uncertainty of projection was evaluated by ensemble simulations for four different SST distributions ([1]Mizuta et al. 2014) and three different cumulus convection schemes.

Precipitation projected by the 20-km model over the Arctic (67.5-90N) increases in summer (Jun-Aug; Fig. 1) as well as winter (Dec-Feb), which is also consistent with ensemble simulations by the 60-km models. Also, precipitation intensity increases.

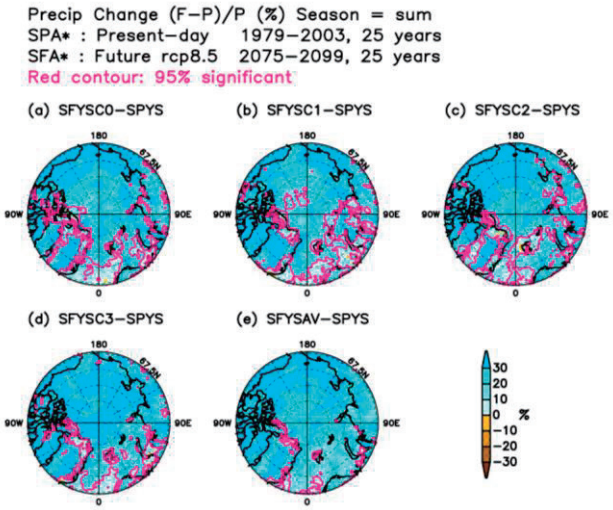

Figure 1 Future change (%) in precipitation projected by the 20-km model for summer. (a) CMIP5 mean SST. (b) Cluster 1 SST. (c) Cluster 2 SST. (d) Cluster 3 SST. (e) Average of (a-d).

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[1] Mizuta, R., O. Arakawa, T. Ose, S. Kusunoki, H. Endo, and A. Kitoh, 2014: Classification of CMIP5 future climate responses by the tropical sea surface temperature changes. SOLA, 10, 167-171, doi:10.2151/sola.2014-035.