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Past and Future Regional Climate Change in Korea

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ABSTRACT

During the last century, most scientific questions related to climate change were focused on the evidence of anthropogenic global warming (IPCC, 2001). There are robust evidences of warming and also human-induced climate change. We now understand the global, mean change a little bit better; however, the uncertainties for regional climate change still remains large. The purpose of this study is to understand the past climate change over Korea based on the observational data and to project future regional climate change over East Asia using ECHAM4/HOPE model and MM5 for downscaling.

There are significant evidences on regional climate change in Korea, from several variables. The mean annual temperature over Korea has increased about 1.5~1.7℃ during the 20th century, including urbanization effect in large cities which can account for 20-30% of warming in the second half of the 20th century. Cold extreme temperature events occurred less frequently especially in the late 20th century, while hot extreme temperature events were more common than earlier in the century. The seasonal and annual precipitation was analyzed to examine long-term trend on precipitation intensity and extreme events. The number of rainy days shows a significant negative trend, which is more evident in summer and fall. Annual precipitation amount tends to increase slightly during the same period. This suggests an increase of precipitation intensity in this area. These changes may influence on growing seasons, floods and droughts, diseases and insects, marketing of seasonal products, energy consumption, and socio-economic sectors.

The Korean Peninsular is located at the eastern coast of the largest continent on the earth withmeso-scale mountainous complex topography and itspopulation density is very high. And most people want to hear what will happen in their back yards.It is necessary to produce climate change scenario to fit forhigh-resolution (in meteorological sense, but low-resolution in socio-economic sense) impact assessment. We produced one hundred-year, high-resolution (~27 km), regional climate change scenario with MM5 and recognized some obstacles to be used in application. The boundary conditions were provided from the 240-year simulation using the ECHAM4/HOPE-G model with SRES A2 scenario. Both observation and simulation data will compose past and future regional climate change scenario over Korea.