



NIMS/KMA Plans for Climate Change Projection Production and Utilization on CMIP7

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The National Institute of Meteorological Sciences in the Korea Meteorological Administration (NIMS/KMA) has been actively contributing to the CMIP program since CMIP3. NIMS participated in CMIP6 through a collaborative effort with the UK Met Office Hadley Centre as part of a mutually agreed scientific plan. Within this collaboration, NIMS utilized the Earth System Model developed by the UK Met Office (UKESM) to generate future climate change scenarios for four distinct Shared Socio-economic Pathways (SSPs). NIMS also employed the KMA Advanced Community Earth (K-ACE) model, a modified version of HadGEM2-AO developed through in-house research, to analyze global climate projections. Five different regional climate models were used for the regional climate simulations: HadGEM3-RA, RegCM4, CCLM, GRIMs, and WRF, organized under the CORDEX-EA (East Asia) program. Furthermore, for the South Korean area, NIMS produced 1km resolution climate change scenario data using the statistical downscaling technique, the Parameter-elevation Relationships on Independent Slopes Model (PRISM)-based Dynamic downscaling Error correction (PRIDE). These projections played a pivotal role in contributing to the preparation of the Sixth Assessment Report (AR6) by the Intergovernmental Panel on Climate Change (IPCC) and provided crucial foundational data for national climate change adaptation efforts.

Currently, NIMS has initiated preparations for CMIP7 participation. In this program, K-ACE will be employed for producing global climate projections, having undergone improvements such as coupling with an ocean-biogeochemistry model, TOPAZ, and modifications to the cloud-aerosol process, among other enhancements. NIMS plans to use a reduced number of RCMs compared to the CMIP6 phase but intends to increase the ensemble members by combining physical processes. Currently under consideration as RCM candidates are WRF and WRF-ROMS. To comprehend the impact of climate change on local-scale heavy rain, a Convection Permitting Model (CPM) with a spatial resolution of about 2.5km can be employed. For the South Korean region, our objective is to produce more high-resolution, detailed climate scenarios through sensitivity experiments and reliability verification studies.

This presentation aims to introduce KMA's Earth System Models, aligning with recent trends and developments outlined in CMIP7, and presenting the overall plans for the generation and utilization of global-regional-local climate projections in line with CMIP7.