Geophysical Research Abstracts,
Vol. 10, EGU2008-A-04085, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-04085
EGU General Assembly 2008

Sensitivity of recent and future regional climate simulations to two convection schemes in the RegCM3 nesting system

Eun-Soon Im(1), Filippo Giorgi(1) and Won-Tae Kwon(2)

(1) Abdus Salam International Centre for Theoretical Physics, Trieste, Italy

(2) Climate Research Team, METRI, KMA, Seoul, Korea

This study investigates the sensitivity of convective parameterization schemes (CPS) in a regional climate change scenario simulated by using a RegCM3 double-nested modeling system. The validation of a recent climate (1971-2000) and projection of a future climate (2051-2080) are discussed, with a focus on the comparison between both simulations implementing two different CPS, namely, the Grell scheme (Grell) and the MIT-Emanuel scheme (EMU). Based on the recent climate simulations, the EMU simulation shows a considerable improvement compared to the Grell simulation, indicating a reduction of cold and dry biases in the summer season. In general, the convective precipitation derived by EMU is larger than that of Grell, which can be explained by a large amount of moist static energy, being more favorable for activating convection. However, the signal of future change derived by the difference between the recent and future climate simulations tends to be insensitive to the characteristics of the baseline climate condition due to the subtraction of the systematic error in the underlying model. Both projections (Grell vs. EMU) agree in the direction of climate change, giving us more confidence in the projected temperature and precipitation changes. The temperature change shows a well-recognized feature of a warming signal with a maximum in winter, indicating statistical significance at the 5% confidence level in all seasons. For precipitation changes, the statistical significance is restricted to the cold season. The enhancement of winter precipitation is significant, increasing by approximately 50% during 2051-2080.