Impacts of Land Cover Change and Urban Parameterization Scheme on Near Surface Temperature and Wind speed using UM

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This study examines the impact of urban parameterization scheme and the land cover change on simulated meteorological variables such as 1.5-m temperature and 10-m wind speed using Unified Model (UM). We perform four sensitivity tests by varying the land cover and the urban parameterization scheme, then compare the model results with 46 AWS observation data. The focus of our study is over the Seoul metropolitan area for heat waves that occurred from 2 to 9 August 2016. We apply the Met Office Reading Urban Surface Exchange Scheme (MORUSES)(EXP2 and EXP3) instead of the Best scheme(CTL and EXP1) for urban parameterization. For land cover change, EGIS (Environmental Geographic Information Service) of Ministry of Environment in Korea (2007) land cover data(EXP1 and EXP3) is applied instead of IGBP (International Geosphere and Biosphere Programme, 1993-1994) (CTL and EXP2). As a result of land cover change, EXP1 increases the surface sensible heat flux by up to 60 $\mathrm{Wm^{-2}}$ and the temperature by up to 1.5°C along the area of increased urban fraction compared to CTL. The comparison of EXP1 with observations reveals that RMSE of temperature and wind speed slightly improved. Sensitivity tests against observations also show that EXP3 with EGIS data and MORUSES has the most improved RMSE in the 1.5-m temperature. On the other hand, RMSE of the 10-m wind speed is reduced in EXP1 using EGIS data and Best scheme.