Impact of MODIS land cover data on surface predictions over Taiwan in the FV3GFS model

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The global numerical weather prediction (NWP) system based on the FV3GFS model jointly developed by U.S. National Centers for Environmental Prediction (NCEP) and Geophysical Fluid Dynamics Laboratory (GFDL) has been implemented in the Taiwan's Central Weather Bureau (CWB) forecast system for the next generation global NWP operations. Currently, NCEP FV3GFS model provides land use dataset retrieved from Moderate Resolution Imaging Spectroradiometer (MODIS) satellite observations. The MODIS 20-category data is composed of roughly 12 km resolution data elements. However, the modified of the 20-class MODIS land cover dataset with a resolution of 500 m which defined by the International Geosphere-Biosphere Program (IGBP) is provided by WRF model. A significant difference between these two datasets is MODIS data from NCEP FV3GFS as being extremely urbanized in western Taiwan. In a case of weaker synoptic-scale forcing, the modified MODIS land cover dataset from WRF model result in a larger improvement in 2-m temperature and 2-m mixing ratio when compare to the surface observations over Taiwan. The reason results from the overestimation of urban area in NCEP FV3GFS model, which contains previous and low-resolution MODIS dataset. Moreover, there is a bias reduction in 10-m wind speed as well as thermal effects. The detailed results will be presented in the conference.