Impact of different static data on FV3GFS nested predictions. Part I: Land use and land cover

Ling-Feng Hsiao, Feng-Ju Wang, Ting-An Chen, Jen-her Chen

Central Weather Bureau

Abstract

In the past three years, FV3GFS has been implemented in Central Weather Bureau (CWB) with a C384T (25-km resolution) global domain and a high-resolution (4.8-km resolution) nested domain. A value-added 0.5-km land cover product from Moderate Resolution Imaging Spectroradiometer (MODIS) is found to provide an accurate land use type over Taiwan area in FV3GFS model. In particular, the new land use date is able to improve the urban distributions over the western Taiwan. Therefore, this study is evaluated the surface weather forecast using the new land use datasets in FV3GFS model and is compared with the datasets from original MODIS. The results showed that the new land use data was able to provide a more correct urban-type distribution and then improve the surface forecasts in terms of 2-m temperature and mixing ration, latent heat flux, and sensible heat flux. The major factor regarding the improvement is that the reduced urbanization process leads to increased surface latent heat flux forecast and consequently decreased surface forecast errors for temperature and water vapor, especially over the western Taiwan. Due to the urban-type land use category providing the seldom evapotranspiration process in the coupled FV3GFS- Noah LSM (land surface model) system, the extreme urbanization process tends to decrease surface latent heat flux and increase surface temperature. The detail will be presented in the conference.

Keywords: FV3GFS, Land use and land cover, surface weather forecast