Geophysical Research Abstracts
Vol. 19, EGU2017-12696, 2017
EGU General Assembly 2017

Impact of implementation of spaceborne lidar-retrieved canopy height in the WRF model

Junhong Lee and Jinkyu Hong
Ecosystem-Atmosphere Process Lab, Department of Atmospheric Sciences, Yonsei University, Seoul, South Korea

Canopy height is closely related to biomass and aerodynamic properties, which regulate turbulent transfer of energy and mass at the soil-vegetation-atmosphere continuum. However, this key information has been prescribed as a constant value in a fixed plant functional type in atmospheric models. This presentation reports impacts of using realistic forest canopy height, retrieved from spaceborne LiDAR, on regional climate simulation in the Weather Research and Forecasting (WRF) model's land surface model. Numerical simulations were conducted over the Amazon Basin and East Asia during summer season. Over these regions, the LiDAR-retrieved canopy heights were higher than the default values used in the WRF,which are dependent only on plant functional type. By modifying roughness length and zero-plane displacement height, the change of canopy height resulted in changes in surface energy balance by regulating aerodynamic conductances and vertical temperature gradient, thus modifying the lifting condensation level and equivalent potential temperature in the atmospheric boundary layer. Our analysis also showed that the WRF model better reproduced the observed precipitation when LiDAR-retrieved canopy height was used over the Amazon Basin.