Geophysical Research Abstracts,
Vol. 11, EGU2009-4519, 2009
EGU General Assembly 2009

Improvement of surface albedo parameterization within a regional climate model (RegCM3)

Y. Bao and Shihua Lv

Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences (CAS), China (byan@lzb.ac.cn)

ABSTRACT

A parameterization for calculating surface albedo of Solar Zenith Angel (SZA) dependence with coefficient for each vegetation type determined on the Moderate Resolution Imaging Spectro-radiometer (MODIS) reformed by the Bidirectional Reflectance Distribution Function (BRDF) is incorporated within the latest Abdus Salam International Centre for Theoretical Physics (ICTP) Regional Climate Model (RegCM3), and evaluated with a high resolution one-way nesting simulation in China using the Climate Research Unit (CRU) data and the observations from the Field Experiment on Interaction between Land and Atmosphere in Arid Region of Northwest China (NWC-ALIEX). The performance of the SZA method modeling surface characteristic is investigated.Results indicate, RegCM with SZA method (RCM_SZA) considerably improve the cold bias of original RegCM (RCM_ORI) in air surface temperature in East Asia with 1.2 degree increased in summer due to the lower albedo produced by SZA method which makes more solar radiation absorbed by the surface and used for heating the atmosphere near to the surface. The simulated diurnal cycle of ground temperature conforms fairly well to the observation in the nesting simulation in northwest China, especially during the noon time when the SZA has the lowest value. However, the modification can not obviously affect the East Asia summer monsoon precipitation simulation although RCM_SZA produce more evapo-transpiration in surface with more than 2 W-2 increases in simulated latent heat fluxes both in East Asia and in northwest China compared to RCM_ORI.

Key words: [U+F020][U+F020] Albedo, Solar zenith angle (SZA), Cold bias, RegCM3