



A Mountain Glacier Scheme for Regional Climate Model and Its Preliminary Results

Duoying Ji and Yongjiu Dai

State Key Laboratory of Earth Surface Processes and Resource Ecology, College of Global Change and Earth System Science, Beijing Normal University, Beijing 100875, China

As an important inland freshwater resource, mountain glacier is highly related to human life, and playing a very important role in regional water cycles. Contemporary regional climate models (RCMs) give a simplified representation, which describes the mountain glacier as a static land mask, without considering ablation and accumulation. In this study a mountain glacier scheme was developed for RCM. This new scheme includes the following characteristics: (1) thermodynamics of glacier, including the metamorphism and densification of snow cover, and the transformation from snow to glacier; (2) a fine mesh nested in RCM horizontal grid to match the highly non-uniform spatial distribution of the mountain glacier; (3) revised radiation flux reaching the glacier surface according to the surrounding terrain. The mountain glacier scheme was coupled to the MM5-based regional climate model (CMM5) and used to study mountain glacier in China. The simulation results showed a reasonable spatial pattern on glacier melting. The fine-mesh strategy improved the model and was able to distinguish the ablation difference between the south and north aspect of the mountain within a single RCM grid. Different ablation/accumulation curves appeared on glaciers under different climate conditions and geographical location. Further study is underway to investigate mountain glacier response to the different IPCC climate projection scenarios in China.