Japan Geoscience Union Meeting 2010
(May 23-28 2010 at Makuhari, Chiba, Japan)

ACG033-08 Room: Function Room A Time: May 23 11:00-11:15

The Effects of Snow Albedo and Infiltration of Melting Water of Eurasian Snow on East-Asian Summer Monsoon Rainfall

Kazuyoshi Souma[1*], Yuqing Wang[2]

[1]University of Yamanashi, [2]University of Hawaii

The effect of Eurasian spring snow amount on East-Asian summer monsoon rainfall has been previously studied based on both observations and numerical simulations. The results indicate that information on the Eurasian spring snow amount could be important for seasonal prediction of East-Asian summer monsoon (EASM) rainfall. Although previous studies identified the effects of snow albedo and melting water of Eurasian snow on global climate, their individual contributions to the prolonged snow effect on early summer regional climate have not been evaluated quantitatively.
In this study, the relative importance of the effects of snow albedo and snow melt water over the Tibetan Plateau on the simulated EASM rainfall is investigated using a regional climate model. Three ensemble simulations with horizontal resolution of 0.5 deg were conducted. The first ensemble simulation (CTRL) considers the actual snow cover in the initial condition. The second ensemble simulation (NOAL) ignores the snow effect on the surface albedo in the radiation budget. The third ensemble simulation (NOSM) ignores the infiltration of snow melt water. A detailed comparison of these simulations indicates that the albedo effect is significant and its effect on rainfall amount over the Yangtze River Basin is about three times that of the effect of snow melt water in May-June. The albedo effect decreased from July to August, while the effect of snow melt water increased. Eventually the difference between the two effects became insignificant. Overall, the snow albedo effect over the central and western Tibet appears to dominate the observed relationship between the spring snow anomaly and the EASM rainfall anomaly.
Additionally, the possible researches about sea-land interaction through atmosphere will be discussed using some reviews about the effect of SST on the snow anomaly over Tibetan Plateau and the effect of EASM rainfall anomaly on freshwater supply to ocean.

Keywords: Eurasian Snow, East-Asian Summer Monsoon, Land/atmosphere interactions, Regional climate modeling