

P17

Frequency change of Asian dust events depending on surface conditions

Jae-Hyun Ryu(1), Chu-Yong Chung(1), Sang Jin Lyu(1), Sungwook Hong(2)
and Inchul Shina(1)

(1) *KMA/NMSC,*

(2) *Department of Environment, Energy, and Geoinformatics, Sejong University*

Asian dust outbreaks are known to be related to soil cohesion that is reinforced when surface condition is wet. This study is to investigate the frequency change of Asian dust events depending on surface conditions. The variables that explained the frequency change of Asian dust are tried to be found, and the thresholds for the index of the Asian dust occurrence depending on surface and hydrologic variables are determined. The data used in this study are surface synoptic observations (SYNOP), satellite-derived soil moisture, normalized difference vegetation index (NDVI), land surface temperature (LST), evapotranspiration (ET), precipitation, and snow cover fraction (SCF) over East Asia (30°N to 50°N and 90°E to 125°E) from January 2000 to April 2015. The present weather codes 7, 8 and 9 from SYNOP are assumed to be an indication of dust outbreak on the observation station. About 90% of Asian dust occurs on condition that soil moisture is below 9.5%; NDVI, below 0.259; LST, above 275.2 K; ET, below 25.9 mm/month; precipitation, below 30.3 mm/month; and SCF, below 4.3%. In order to analyze the effect of surface condition on dust outbreak, the normalized indices are introduced for each variable. Especially, the ratio for actual ET and potential ET (AET/PET) is considered and the AET/PET is found to be the variable to explain the frequency change of Asian dust events best among surface and hydrologic variables. Around 68.41% of Asian dust occurs in case the normalized ratio of AET/PET has negative value. When the normalized index for each variable is negative, Asian dust is more likely to occur as well and the occurrence percentage shows as follows: soil moisture, 55.75%; NDVI, 55.52%; evapotranspiration, 61.54%; and precipitation, 67.71%. On the other hand, when the normalized LST index has positive value, Asian dust happened about 58.00%. This study shows that surface conditions are important to diagnose Asian dust generation. The variables explained the frequency change of Asian dust events can help researcher to study Asian dust and to improve dust model.