Ecosystem Modeling for a Temperate Grassland Wind-Erosion Scheme

BANZRAGCH, Nandintsetseg[1]*, Masato Shinoda[1]

[1]Arid Land Research Center, Tottori University, Japan

Temperate grasslands are significant or potentially significant source for dust emission; however, detailed relationships among dust emission and characteristics of grasslands, in particular the special roles of vegetation and grazing are not well documented. Moreover, existing dust models do not have sufficient capability in modeling vegetation growth and decay, which play a major role in temperate grassland aeolian processes. In this study, we assessed the grassland ecosystem model (DAYCENT) for its capability to provide estimations of vegetation dynamics under different grazing conditions in order to incorporate into a temperate grassland wind-erosion scheme. DAYCENT model was parameterized with the field experiment data (soil physical/chemical properties, vegetation and grazing) at the Bayan Unjuul (BU) site in 2010-2011. BU is located in north of the most frequent dust outbreak region in Mongolia. The results from the model have been validated 8-years (2003-2010) plant phytomass (Live, dead, and litter) and species, and soil data obtained at the grazed and un-grazed areas at the BU. Generally, the model performed reasonably well in simulating seasonal and interannual variations in the observed plant production. However, some discrepancies may be due to the fact that the model does not consider year-to-year changes in plant species composition. It is important to note that the model could simulate realistically the effect of grazing on grasslands and vegetation memory, which suppressed dust outbreaks. Therefore, this model will provide a useful tool for dust emission study in temperate grasslands.

Keywords: Temperate grasslands, Ecosystem modeling, Integrated Wind-Erosion Scheme, Dust emission, Vegetation