

The Variation and Factors of Plant Phenology in Mongolia

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Aridification due to global warming has been reported in the northern hemisphere in recent years, and there is concern about the impact on the ecosystem. Plant phenology is generally used as an index to know the ecological changes because of the climate change. Especially spring plant phenology which is represented by budding etc., most sensitively affects climate change. Mongolia locates arid and semi-arid area and has several different vegetation zones such as forest zone and desert zone. Therefore it is considered that Mongolia is one of the region that the influence of climate change becomes obvious initially. In addition, more than half of the land in Mongolia is grassland belongs to the step zone, and nomadic has been continued in grassland for more than 2000 years. However, considering climate change in recent years, it is necessary for the nomadic area to maintain the vegetation condition of the grassland, and appropriate grassland management is indispensable. From these, it is important to understand the mechanism of plant phenology in Mongolia and clarify its factors.

In this paper attempts to describe seasonal and interannual changes of phenology and its factors in grassland vegetation in Mongolia using observation data and remote sensing method. The observation has been made at Natural Environmental Monitoring Stations (NEMS) operated by Institute of Meteorology and Hydrology (IMH), Mongolia.

Observational data on grassland vegetation reveal that there are large interannual and spatial variation in vegetation phenology. The difference between maximum and minimum reaches 60 days in emergence date. There is different spatial distribution in each phenological stages depending on the year. Phenology has close relationship to soil moisture. Soil moisture status in early growing stage determine the timing of emergence, and soil moisture after emergence affects the amount of biomass. The increase in the length of growing season does not directly connect to the increase in biomass, and the most important factor for increasing biomass amount is the timing of increasing soil moisture. And also we attempt to estimate the start of growing season (SOS) using SPOT/VEGETATION data. This is one of a satellite image dataset and the spatial resolution is around 1km * 1km. We calculate several vegetation indices and try to find the best way to estimate SOS for all grassland type in Mongolian vegetation. It can help to manage to maintain the nomadic grassland condition in the future.

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