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The impact of "Dzud" on vegetation condition in Gobi regions of Mongolia

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A Dzud is a climate event in the Mongolian that causes serious environmental and economic damage. Although a natural phenomenon, its effects can be exacerbated by human activities such as livestock overgrazing and inadequate fodder, resulting in mass deaths of the livestock in the spring following a severe winter. This article is based on the analysis of various Dzud events (2000, 2001, 2002, and 2010) and their specific effect on the vegetation condition by analyzing Normalized Difference Vegetation Index NDVI in the Gobi regions of Mongolia. Our evaluation methods utilize the seasonal aridity index, time series of MODIS NDVI and data from livestock statistics. Heavy snowfall is one of the limiting factors for animal productivity and socioeconomic development in Mongolia. Based on the findings, steppe areas have the highest degree of vulnerability of climate, with the potential decline of growth grassland being stronger for humid areas. When there are high snowy winters, there is a 10 to a 20-day earlier peak of NDVI values as well as an increase in vegetation growth. Additionally, grazing pressure (caused by high livestock loss) played a minor role in plant growth. We found that during the dry winter conditions of a black Dzud, low soil moisture, and high evapotranspiration, the vegetation growth phase begins later due to water deficiency, leading to a lower peak in growth. During the year 2009/2010, a white Dzud occurred in the presence of a thick snow layer, which acted as a water reservoir. The effect of livestock loss and the reduction of grazing pressure played a minor part in vegetation recovery after different types of Dzud events in Mongolia.