

Grazing pattern and climate factors influencing grassland cover change in Qilian County,
Qinghai Province, Northwest China

(中国北西部, 青海省, 祁連県における家畜放牧パターンと草地被覆変化に影響を与える気候要因)

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Qilian Mountains, which support water resource and vegetation resource for human being, is located in Northwest China. In the past years, Qilian Mountains experienced severe grassland degradation due to inappropriate human activities and climate change. Qilian County, which is located in Qinghai Province, covers 1,388,000 km² of area and the main land cover is grassland. Animal husbandry is the traditional industry in this area: over 85% of the annual income of the primary industry is from animal husbandry.

This study aims to understand the grazing pattern and influence of air temperature and precipitation to grassland cover change in the study area based on face-to-face interview in the field and MODIS-EVI (Enhanced Vegetation Index) time-series data. The fieldwork was conducted in the E-bao town from 22nd September to 6th October 2017. A further field survey was not possible because of security reasons. E-bao town is located in the northeast part of Qilian County and 72 km away from the center of Qilian County. It is the birthplace of seasonal grazing in Qinghai Province.

The results of fieldwork show that the land use by livestock grazing follows traditional complex movement patterns. Summer and winter grasslands receive different management: multi-household management and single household management. Multi-household management is practiced in summer-autumn grazing area by a village or town manager. Single-household management is practiced in winter-spring grazing area with fence by a single household. The livestock density is quite high in the study area: in 2016, the livestock density of the summer and autumn grasslands was 4.91 sheep/ha, and that of the winter and spring grasslands was 5.33 sheep/ha.

The results of the statistical analysis based on MODIS-EVI and climate data from 2000 to 2015 indicate that the air temperature and precipitation have influence on grassland cover change in Qilian County. Monthly mean precipitation has a greater effect on monthly mean EVI from 2000 to 2015. However, monthly mean air temperature has a greater influence on monthly mean EVI than precipitation in summer time. In another side, the annual air temperature and precipitation did not show a significant impact on annual EVI change, while there is insignificant correlation between annual income of animal husbandry and annual EVI in the study area. Further, the “National Park Plan” launched by the central government in 2017 would be the major driver of grassland cover change in the study area because this policy prohibits any grazing activities in the Qilian Mountains.