

## GC31B-0464 Herbivore Impact on Tundra Plant Community Dynamics Using Long-term Remote Sensing Observation

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Wednesday, December 17, 2014 08:00 AM - 12:20 PM

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Arctic tundra biome is now experiencing dramatic environmental changes accentuated by summer sea-ice decline, permafrost thaw, and shrub expansion. Multi-decadal time-series of the Normalized Difference Vegetation Index (NDVI, a spectral metric of vegetation productivity) shows an overall “greening” trend across the Arctic tundra biome. Regional trends in climate plausibly explain large-scale patterns of increasing plant productivity, as diminished summer sea-ice extent warms the adjacent land causing tundra vegetation to respond positively (increased photosynthetic aboveground biomass). However, at more local scales, there is a great deal of spatial variability in NDVI trends that likely reflects differences in hydrology and soil conditions, disturbance history, and use by wildlife and humans. Particularly, habitat use by large herbivores, such as reindeer and caribou, has large impacts on vegetation dynamics at local and regional scales, but the role of herbivores in modulating the response of vegetation to warming climate has received little attention. This study investigates regional tundra plant community dynamics within inhabits of different sizes of wild caribou/reindeer herds across the Arctic using GIMMS NDVI (Normalized Difference Vegetation Index) 3g data product. The Taimyr herd in Russia is one of the largest herds in the world with a population increase from 450,000 in 1975 to about 1 million animals in 2000. The population of the porcupine caribou herd has fluctuated in the past three decades between 100,000 and 180,000. Time-series of the maximum NDVI within the inhabit area of the Taimyr herd has increased about 2% per decade over the past three decades, while within the inhabit area of the Porcupine herd the maximum NDVI has increased about 5% per decade. Our results indicate that the impact of large herbivores can be detected from space and further analyses on seasonal dynamics of vegetation indices and herbivore behavior may provide more understanding of the plant-herbivore interactions within the context of a ‘greening’ Arctic.

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