

GC33F-06: Synthesis of Decades of Change in Northern Eurasian Ecosystems: Current Assessment and Future Projections

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Northern Eurasia (NE) is a distinct and crucial region because it has the physical size necessary to effect regional and global climate, and interacting socioeconomic and political drivers have provided the impetus to quell or exacerbate change. The circumboreal zone contains the largest stocks of terrestrial carbon on Earth, and NE holds 2/3 of that carbon pool. Recent climate change data and models agree that temperature increases in NE have been and will be among the greatest on the planet, leading to longer growing seasons, increased evapotranspiration, extreme fire weather, increased permafrost, ice, and snow melting, all of which are altering NE ecosystems. Moreover, socioeconomic and political forces have often driven land cover and ecosystem changes in NE.

Satellite data, paired with cooperative partnerships that have evolved over the decades, have enabled researchers to improve our understanding of these complex interacting systems. Analyses of long-term data reveal increasing abandonment of marginal croplands, shifts in crop types and agricultural practices, and increasing logging. Despite regional differences, these changes influence carbon storage, changes in surface albedo, wildlife distribution and habitat, and the availability of food and fodder. Detailed individual-species and bioclimatic models project the northward migration of keystone species and pests. These changes across NE feedback to regional and global climate systems with global consequences.

This talk will synthesize past decades of key international NE research and introduce new highlights. Using long-term satellite data, we have developed detailed maps that have not been previously available, which increase our understanding of these complex interacting systems.

Over the decades, as strides have made in understanding the complexity of NE, our ability to continue collaborative interactive research is being limited by political pressures outside of the purview of science.