Proof

CONTROL ID: 1797825

TITLE: Vegetation controls on carbon, water, and energy dynamics with implications for permafrost thaw

ABSTRACT BODY: Changes in ecosystem structure and function characterized by climate induced alterations in vegetation communities will exert strong influence on the fate of permafrost carbon via controls on surface energy partitioning. These controls are likely to occur both directly through changes in ground heat fluxes and indirectly through climate feedbacks associated with changes in albedo and evapotranspiration. Larch forests of northeastern Siberia constitute the largest ecosystem type underlain by continuous permafrost and therefore warrant considerable attention in this regard.

Here we report observations of carbon, water, and energy fluxes made using the static chamber method for three understory vegetation communities in a mature northeastern Siberian larch forest. We find that carbon and water fluxes tend to increase in magnitude with NDVI, with carbon fluxes exhibiting net uptake during the growing season in vegetation communities dominated by deciduous shrubs. Communities characterized by a combination of evergreen and deciduous shrubs and mosses, or by lichens we find lower water fluxes and carbon neutrality. In the case of lichens, water fluxes are low while surface and soil temperatures as well as thaw depths are relatively high. These results illustrate the potential for vegetation to influence permafrost dynamics through controls on surface energy partitioning. While our results stem from a relatively small spatial scale, they are a relevant analog for large-scale shifts in arctic and boreal vegetation communities as well as changes in successional dynamics associated with changing disturbance regimes, particularly fire.

CURRENT SECTION/FOCUS GROUP: Global Environmental Change (GC)

CURRENT SESSION: GC049. Environmental, Socio-Economic and Climatic Changes in Northern Eurasia and their Feedbacks to the Global Earth System

INDEX TERMS: 0475 BIOGEOSCIENCES Permafrost, cryosphere, and high-latitude processes , 1631 GLOBAL CHANGE Land/atmosphere interactions, 0426 BIOGEOSCIENCES Biosphere/atmosphere interactions, 1813 HYDROLOGY Eco-hydrology.

AUTHORS/INSTITUTIONS: M.M. Loranty, Geography, Colgate University, Hamilton, New York, UNITED STATES;
L.T. Berner, Forest Ecosystems and Society, Oregon State University, Corvalis, Oregon, UNITED STATES;

CONTACT (E-MAIL ONLY): mloranty@colgate.edu

TITLE OF TEAM:

(No Image Selected)

(No Table Selected)

PRESENTATION TYPE: Assigned by Committee (Oral or Poster)