Poster #1-17

Non-Growing Season Plant and Soil Biogeochemistry in High-Latitude Tundra have Large Effects on Plant Nutritional Status and Carbon Budgets

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BER Program: TES
Project: NGEE Arctic
Project Website: https://ngee-arctic.ornl.gov/

High-latitude permafrost ecosystems store large amounts of organic carbon, primarily because low temperatures hinder decomposition. For high-latitude systems, land models must represent the dominant nutrient (i.e., nitrogen (N) and phosphorus (P)) controls on the C cycle to predict C-climate interactions over the 21st century. Observations in high-latitude, including at the NGEE Arctic site near Barrow (recently renamed Utqiaġvik), AK and alpine systems indicate that plant activity belowground continues well past aboveground senescence. We analyzed non- growing season plant nutrient-uptake and plant-microbe competition at high latitudes, and estimate implications for decadal to centennial-scale Arctic C cycling. We apply two mechanistic ecosystem models (ELM, *ecosys*) that represent nutrient acquisition based on competitor traits (e.g., fine-root biomass, transporter density, V_{max}, affinities) to a high-resolution representation of BEO polygonal tundra and to a 25 km resolution representation of North American tundra. Our results indicate that plant nutrient uptake during the non-growing season have large effects on annual nitrogen losses and the long-term C balance of the Arctic.