**Poster #22**

## Snow-Vegetation-Topography-Permafrost Interactions in the Seward Peninsula, Alaska

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Snow is a critical factor in determining hydrologic, thermal, and ecological processes in Arctic landscapes. Snow depth and density, as well as the timing and duration of snow cover directly influence the thermal regime of frozen ground; the amount of spring runoff and water available for replenishing soils, lakes, ponds and wetlands; snow-vegetation-atmosphere energy exchanges; and the timing and duration of subsurface biogeochemical processes. A key goal of the NGEE-Arctic Phase 2 Science Questions 1 and 5 is to understand and predict how spatial heterogeneity in snow interacts with vegetation composition, micro/macro topography and permafrost dynamics as climate warms and precipitation patterns change. NGEE-Arctic researchers are acquiring snow precipitation, depth, density, ground temperature, snow water equivalent (SWE), vegetation composition and structure and permafrost depth data at hilly sites in the Seward Peninsula. These data are collected at a range of spatial and temporal scales using meteorological stations, in-situ gridded and transect-based surveys, ground-based geophysics, and Unmanned Aerial System mapping techniques. NGEE-Arctic modelers are developing statistical and deterministic models to represent the interactions between snow and landscape characteristics to develop a predictive understanding of the coupled evolution of snow, vegetation and permafrost. Data from our preliminary 2016 snow, permafrost and vegetation surveys at the NGEE-Arctic Teller Road site are demonstrating positive correlations between tall vegetation, deeper snow and deeper permafrost. We are applying the ATS model with this data to quantify these relationships for different vegetation height, density and patch size configurations in hilly watersheds. To improve the statistical robustness of our 2017 surveys we use representative analysis to classify the landscape into key ecotype-topotype units to inform and guide our sampling strategy. This approach should allow us to scale our understanding and prediction of snow–landscape interactions, and their evolution with changing climate, from the hillslope to the watershed and larger regions throughout the Pan-Arctic domain.