**Poster #1-17**

**Modeling Soil Temperature Change in Seward Peninsula, Alaska**

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We apply an ecotype-based modeling approach to model high-resolution permafrost dynamics in the Seward Peninsula - an NGEE-Arctic study region with highly vulnerable warm discontinuous permafrost in the Western Alaska. We use a transient soil heat transfer model developed at the Geophysical Institute Permafrost Laboratory (GIPL-2) to compute temperature dynamics in the ground material. The model solves one dimensional nonlinear heat equation with phase change and assumes the unfrozen liquid water content in soil pores. The spatially distributed model is forced with combination of historical climate and different future scenarios for 1900-2100 with 2x2 km resolution prepared by Scenarios Network for Alaska and Arctic Planning (www.snap.uaf.edu/). Vegetation, snow and soil properties are calibrated according to the ecotype cover and are up-scaled using the Alaska Existing Vegetation Type map for Western Alaska (Fleming, 2015) with 30x30 m resolution provided by Geographic Information Network of Alaska (http://akevt.gi.alaska.edu). A data assimilation technique is applied to recover thermal properties for each ecotype using available observations of air, surface and sub-surface temperatures and snow cover collected by various agencies and research groups (e.g. NGEE, USGS, UAF, USDA). The applied calibration approach considers a natural variability between stations in the same ecotype and finds an optimal set of model parameters for snow and soil within the study area. This approach allows reduction in microscale heterogeneity and aggregated soil temperature data from shallow boreholes which is highly dependent on local conditions. Because of this study we present a series of preliminary high-resolution maps for the Seward Peninsula showing changes in the active layer depth and ground temperatures for the current climate and future climate change scenarios. The modeling results are to be improved within the next NGEE phase.

Fleming MD. (2015). Developing an existing vegetation layer for the Western Alaska LCC region. Technical report, http://akevt.gi.alaska.edu.