**Poster #1-20**

**The Response of Photosynthesis and Respiration to Experimental Warming in the High Arctic**

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The temperature in the Arctic has increased by more than twice the global mean temperature and will continue to rise rapidly over the next century. The high sensitivity of the Arctic to climate change coupled to the increasingly important, yet uncertain role Arctic ecosystems are playing in the global carbon cycle, emphasizes the need to advance understanding and model representation of ecosystem processes and fluxes in the Arctic. Understanding plant photosynthesis and respiration is central to closing this knowledge gap. The Farquhar, von Caemmerer and Berry (FvCB) model of photosynthesis is at the heart of many Terrestrial Biosphere Models (TBMs) yet we lack key information that can enable robust projections of the response and acclimation of key model parameters, such as maximum carboxylation rate, to projected warming in the high Arctic. We also lack the technology necessary to manipulate growth temperature *in situ* and enable the collection of data required to close this knowledge gap. To address this, we developed a novel method for warming the tundra that is focused on advancing understanding of key leaf level plant physiology for implementation in TBMs. Our zero-power warming (ZPW) chambers use passive warming and modulated venting to elevate the thaw season air temperature by ~4°C above ambient. Each year we move our ZPW chambers to new locations to capture different vegetation – focusing on stands that are large enough to support repeated measurement and sampling. We are currently half way through a four-species, four-year data collection effort. Here we present data on the response of photosynthesis and respiration to elevation of thaw season temperature from the first two species we have investigated; *Petasites frigidus* (forb) and *Arctagrostis latifolia* (grass).