Goldschmidt Conference abstract - Sara Sawicki

Title of poster: Ionic content and behavior reflecting changes in an Alaskan glacial hydrological system during the summer melt season.

Hypothesis: Ion chemistry reflects timing of changes in hydrological system/subglacial environment of Wolverine Glacier.

Abstract of poster (300 words maximum):

Glacial meltwaters contribute nutrient loads that are required by downstream ecosystems to thrive. How glacial hydrological systems respond to climate change is largely unknown. In particular, the changes in water chemistry are widely unrecognized. Wolverine Glacier in the Kenai Mountains of Alaska is just one of many glaciers that drain into Prince William Sound and the Pacific Ocean. This project compares physio-chemical variables over the 2016 summer melt season; including meltwater discharge, gauge height, electrical conductivity, ion and carbon chemistry of water from glacial and non-glacial streams within the Wolverine catchment to delineate when the glacier undergoes hydrologic changes. Data thus far indicate differences in the physio-chemical signatures of glacial, tundra and mixed streams within the catchment which can be used to break up the melt season into different hydrological phases. Ions appear to exhibit different behavior during the summer season, in both concentration and presence. For example, many ions such as Calcium shrink in concentration as discharge increases between May-September, while those such as Iron follow discharge and only appear from July. Surprisingly and contrary to many glacial studies, there is no Nitrate story. Major ion concentrations are significantly different overall and exhibit good linear trends with conductivity, allowing for detailed estimates of concentration over the season. These ions will continue to be further investigated as laboratory analysis commences, in comparison to changes in the hydrological system. This project will aid in a better understanding of glacial hydrological systems, glacial ion chemistry, and how changes in both might impact downstream and oceanic ecosystems as glacial melt increases into the future.

3 keywords: hydrological systems, meltwater chemistry, physio-chemical variables