JUNEAU ICEFIELD RESEARCH PROGRAM 2016

JIRP Research Projects: Biogeochemistry

Overview: The character of material present on a glacier surface relates to melt and the chemistry of glacial melt water. This chemistry, in turn, supports ecosystems living on the glacier and determines the presence and diversity of life. Changes in the volume and chemistry of glacier melt drive changes in water quantity and quality, and hence, directly influence river and ocean ecosystems.

JIRP Biogeochemistry: Our objective is to collect chemical information across a snow-to-melt transect to establish the key controls of loading and melt processing. This research will explore the chemical signatures of snow and melt by retrieving shallow snow cores in the accumulation zone and exploring surface melt in the ablation zone. Through this research you will gain field experience in: 1) clean sampling strategies, 2) identification of annual layers and post depositional melt features, and 3) characterization of supraglacial melt streams and cryoconite holes. You will gain expertise in the analysis of snow and melt water chemistry. Additional samples will be processed at laboratories after the program for major ions and particle size. Students who have interests in ecology might also track species richness and abundance, or evaluate soil properties in source areas.

Project Areas: The following baseline research questions set the stage for establishing how the glacier chemical system changes through time in response to climate drivers:

- What is the source and chemical nature of material delivered to the glacier surface?
- How is this material processed post deposition in melt environments?
- How does sediment abundance, size, and reflectivity play a role in chemical delivery and partitioning?
- Why is this partitioning and delivery important to glacier and downstream ecosystems?

Logistics: The bulk of this work is to be focused during the second half of JIRP, with the transect along which measurements will be made extending over the Matthes/Llewellyn divide and on to Camp 26.

Faculty: Listed by dates of involvement

Faculty Leads**:**

- Alison Criscitiello (UCalgary), July 17 – 31 (C10)
- Sarah Fortner (Wittenberg), July 26 – Aug. 9 (C10 – C18)
- Natalie Kehrwald (USGS), July 31 – Aug. 9 (C18)

Additional Faculty:

- Shad O'Neel (USGS), July 31 – Aug. 9 (C18)

Recommended pre-JIRP reading:

Fortner, S. K., et al. 2011. Elevated stream trace and minor element concentrations in the foreland of receding tropical glaciers. *Applied Geochemistry,* 26, 11, 1792-1801.