JIRP Research Project: Geophysics

Overview: Geophysics is the investigation of the physical processes and properties of the Earth. The primary tools used for geophysical investigations include potential fields (e.g. gravity and magnetics), radar, global positioning systems (GPS), both passive and active source seismic surveys, and computer models. In glaciology, these tools are used to investigate ice rheology (which influences ice flow), physical properties of ice, and the process that determine its dynamics (e.g. ice geometry, hydrology, thermodynamics).

JIRP Geophysics: The 2017 geophysics group will primarily focus on producing a map of ice thickness across the Icefield, particularly along the Taku Glacier and its tributaries. We will accomplish this by collecting and processing low-frequency ice penetrating radar data. All newly-collected data will be synthesized with existing ice thickness data sets from gravity surveying and modeling. Results from this summer will be used in subsequent projects focused on modeling the future dynamics of the Icefield. Students will also assist Jonny Kingslake and Elizabeth Case on a firn densification study near the Mathes-Llewellyn divide. This work will include the use of phase-sensitive radar to calculate firn densification rates, vertical ice flow velocities, and water flow through the temperate ice (if possible).

Project Areas: The 2018 geophysics project has two main research themes:
- **Ice geometrical constants**: How thick is the ice? What is the shape of the subglacial topography?
- **Ice dynamics**: How is flow of Taku Glacier affected by its bed shape? Where does the glacier bed reach above sea level?

Logistics: Lessons on geophysics content will begin at Camp 17. Radar system testing will also occur at Camp 17. Field research will start upon arrival at Camp 10. Data interpretation and synthesis will occur at Camp 18.

Faculty Leads:
- Kiya Riverman (University of Oregon) (Juneau and Camp 17)
- Lynn Kaluziensk (University of Maine) (Camp 10)
- Seth Campbell (University of Maine) (Full Season)

Recommended pre-JIRP reading:
