Lake and River Elevation—LVIS, SAR, AirSWOT Summary of Discussion

Thanks to Mark Carroll, rapporteur extraoridinaire

Analyzing 2017 Data

- Water Surface Elevations available from AirSWOT, LVIS
- In situ measurements available for >100 lakes across entire ABoVE domain.
- Goal #1: intercompare AirSWOT, LVIS, and in situ to understand error characteristics of both instruments.

- Community science interests using WSE data:
  - Linking permafrost characteristics with lake hydrology
  - Understanding lake/river and lake/lake connectivity
  - Coupling lake biogeochemistry (esp. carbon) and hydrology
  - Understanding patterns of channel navigability to understand hydrology influences on wildlife and local communities

Planning for the Future

- Combined, near-simultaneous measurements from AirSWOT/LVIS and UAVSAR are a common priority
- AVIRIS flights sometime during the summer to characterize vegetation around lakes/rivers
- Timing goal: flights in early June, early September to capture maximum seasonality

- Some questions that could be addressed by these experiments:
  - What is the total area of seasonally inundated margins around lakes (possible CO_2/Methane hotspots)?
  - How differently do bedrock and permafrost-controlled lakes behave hydrologically? How would permafrost degradation affect lake hydrology?
  - How does lake/lake and lake/river connectivity vary in space? Is it likely to change with changing climate?

Other Thoughts

- Inundation extent measurements from high-res satellites (Planet, Sentinel, etc) can help us out going into the future. Landsat is still our only bet going more than a few years into the past.
- Radar data is essential for inundation extent measurements under vegetation (hence UAVSAR priorities)
- Principle: for people and hydrology, extremes are more important than the mean. We need to focus on measuring (seasonal) extremes.
- We easily articulate relatively localized science questions (e.g. Yukon Flats, Inuvik area). The potential is there to extend many of these questions to significant portions of the ABoVE domain using airborne/spacborne remote sensing.