Final Report
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Aerial monitoring of flood inundation and river ice breakup processes
UCAR Subaward Z16-23490

This project was a highly successful collaboration between the University of Alaska Fairbanks (UAF), the National Water Center/NOHRSC, the Alaska Pacific River Forecast Center (APRFC), the Fairbanks Weather Forecasting Office, the NESDIS Joint Polar Satellite System (JPSS) Proving Ground Program, and the NOAA Hollings Scholar Program. Flights were conducted and data analyzed pertaining to snowmelt processes, river breakup, and potential flood inundation. Results were presented in a talk at the Eastern Snow Conference in Columbus Ohio in June, 2016, in a seminar at the University of Alaska Fairbanks' Institute of Northern Engineering (September, 2016), and to the general public at the Experimental Aviation Association's monthly meeting (July 2016). Breakup imagery was published in the local Fairbanks and Anchorage newspapers and the team was interviewed on several local TV and radio stations. After the culmination of the project, the PI, Cherry, left her faculty position at UAF and joined the APRFC as a staff member bringing her knowledge to operations at NOAA.

Figure 1: Some members of the project team with the aircraft: Sanmei Li (GMU, JPSS Proving Ground collaborator), PI Jessica Cherry (UAF), Craig Kenmonth (contract pilot)

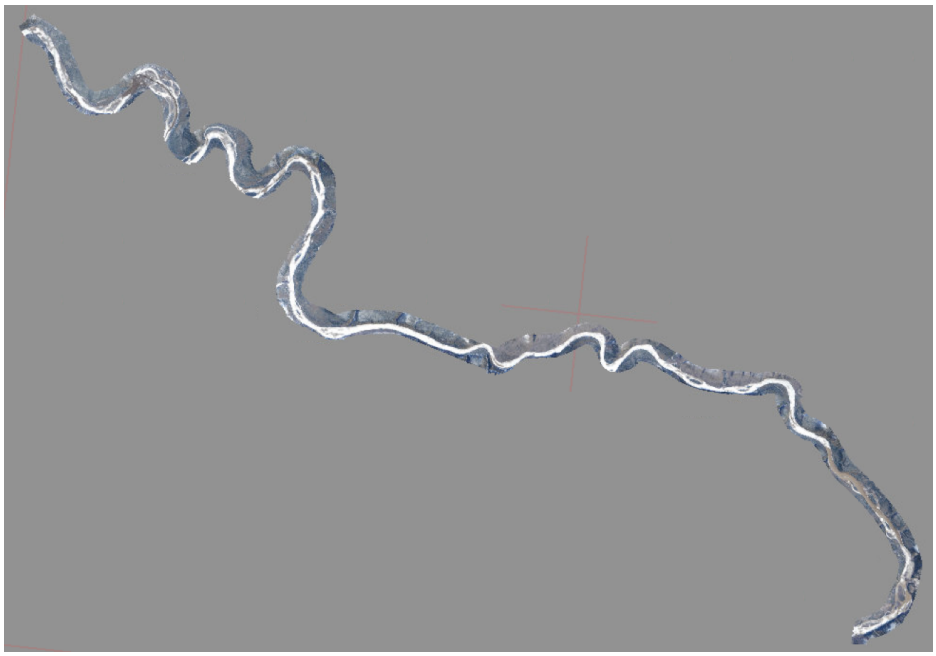

Figure 2: The orthomosaic of the Upper Yukon from Dawson City to Circle on April 21, 2016.

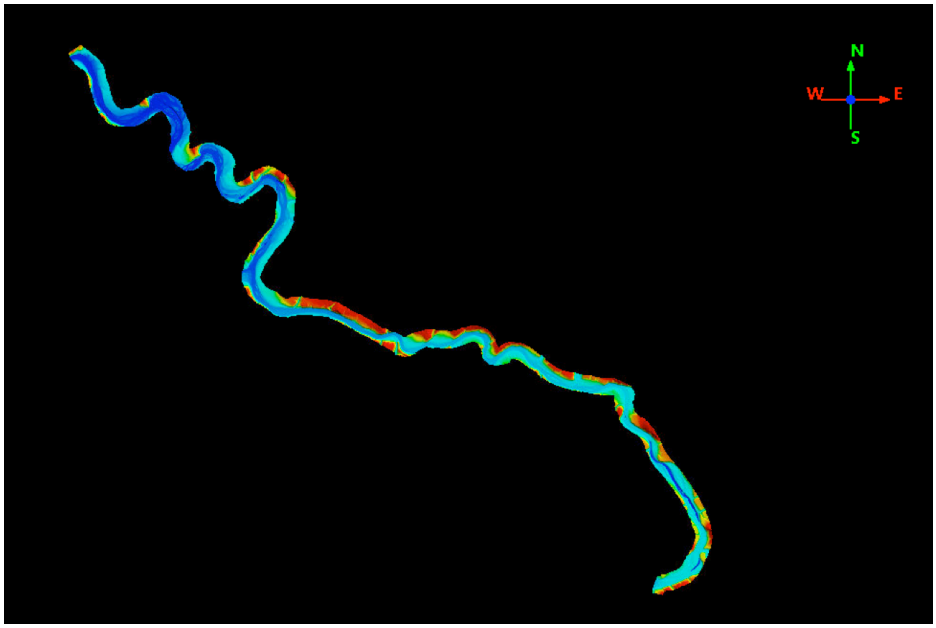

Figure 3: The digital surface model of the Upper Yukon from Dawson City to Circle City on April 21, 2016.

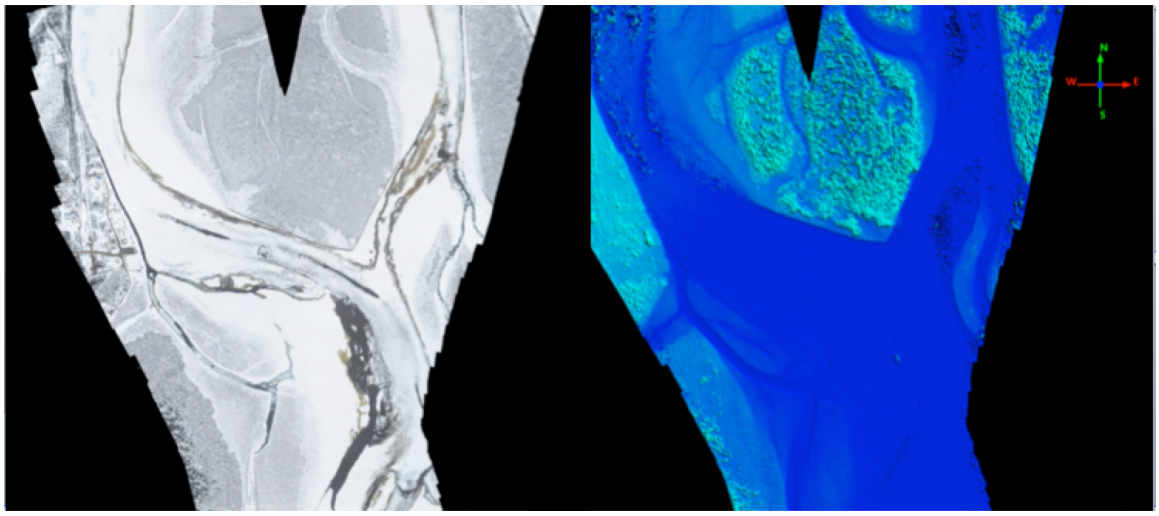

Figure 4: A closeup of the orthomosaic (left) and the digital surface model (right) near Circle City on April 21, 2016.

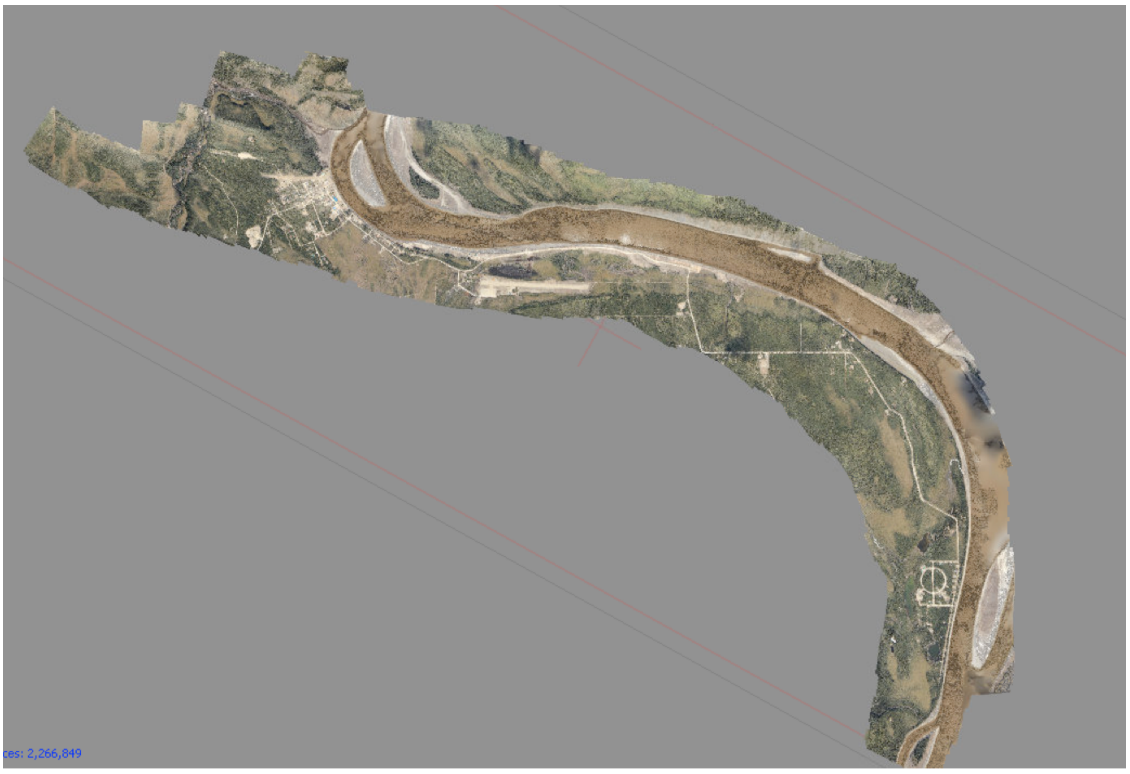
Figure 4: Post-breakup orthomosaic of Eagle collected for use in inundation model.

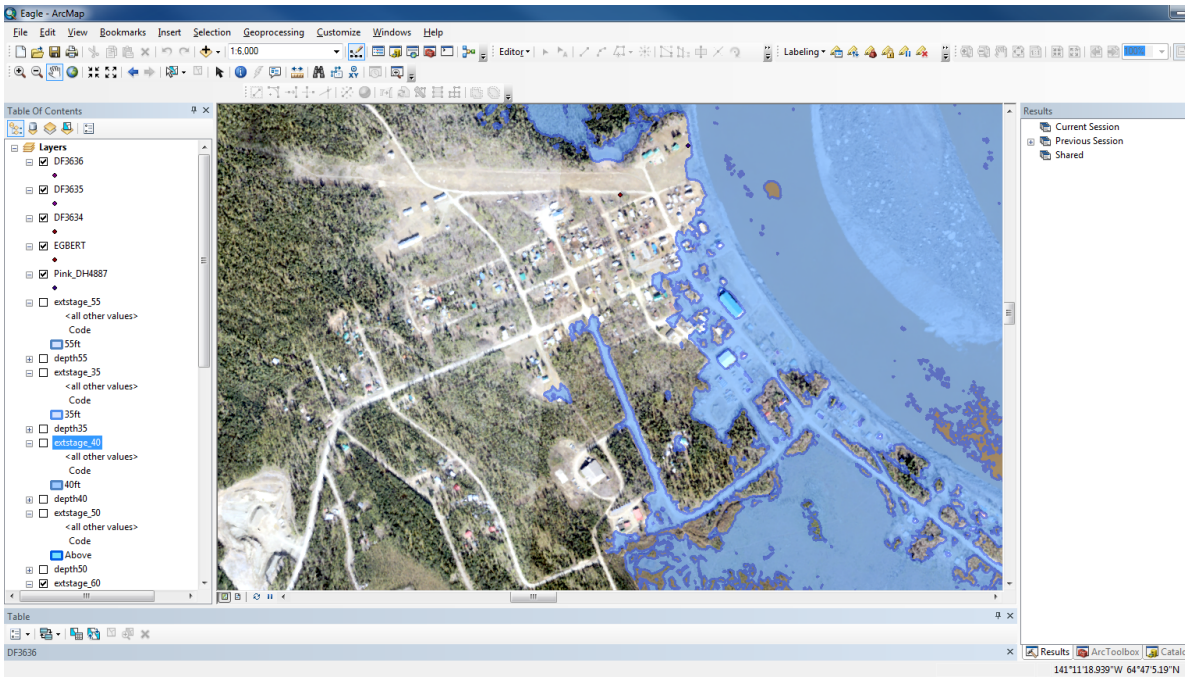

Figure 5: Bathtub model of inundation in Eagle with stage level at 60 ft overlaid on Eagle orthomosaic. Results from summer Hollings Scholar Haley Canham working with Cherry and Fairbanks WFO Service Hydrologist Ed Plumb.

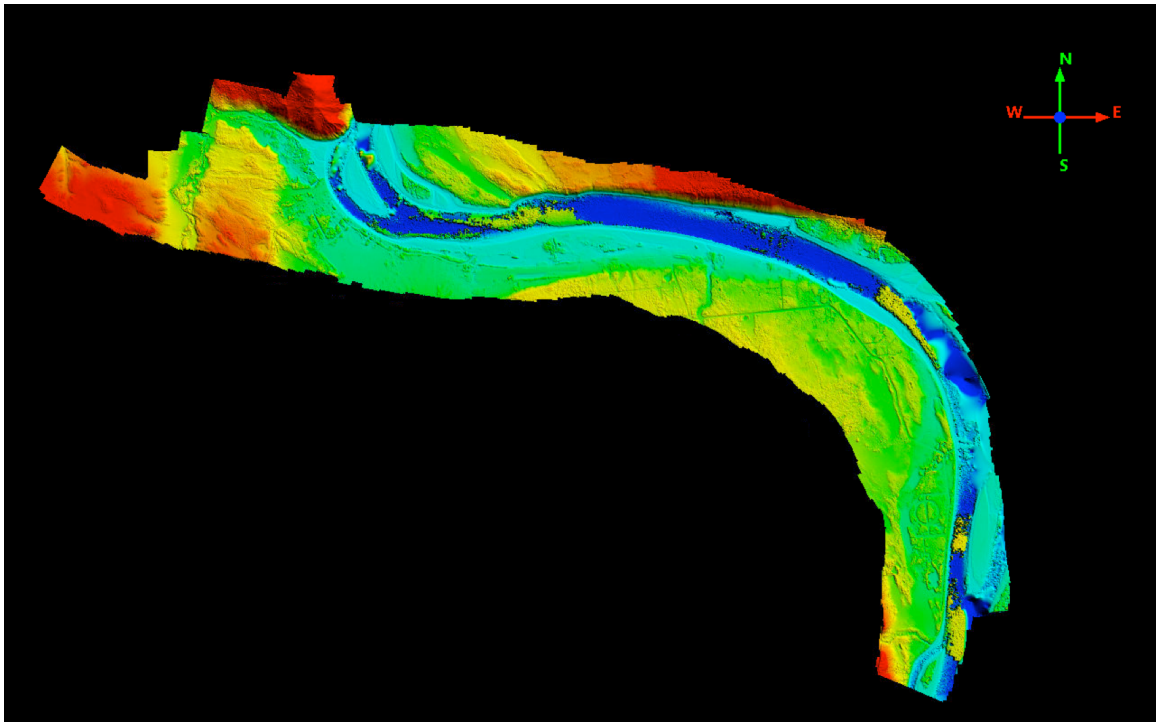

Figure 6: The digital surface model of Eagle derived from the orthoimagery.

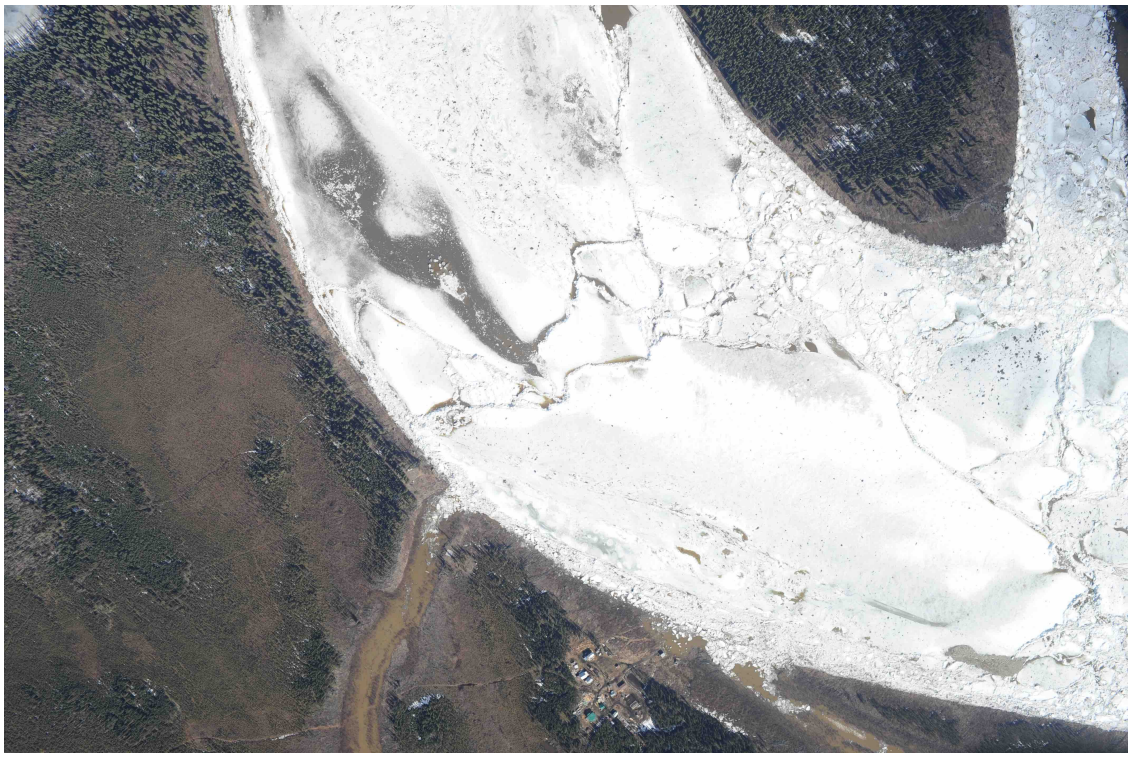

Figure 7: A close up of an ice jam near Eagle at Calico Bluff taken by Cherry during the 2016 flights. The homestead with water encroaching can be seen at the bottom of the image. A story with this ice jam image was published in the Fairbanks and Anchorage newspapers.

Figure 8: A view of the ice jam from the homesteader.

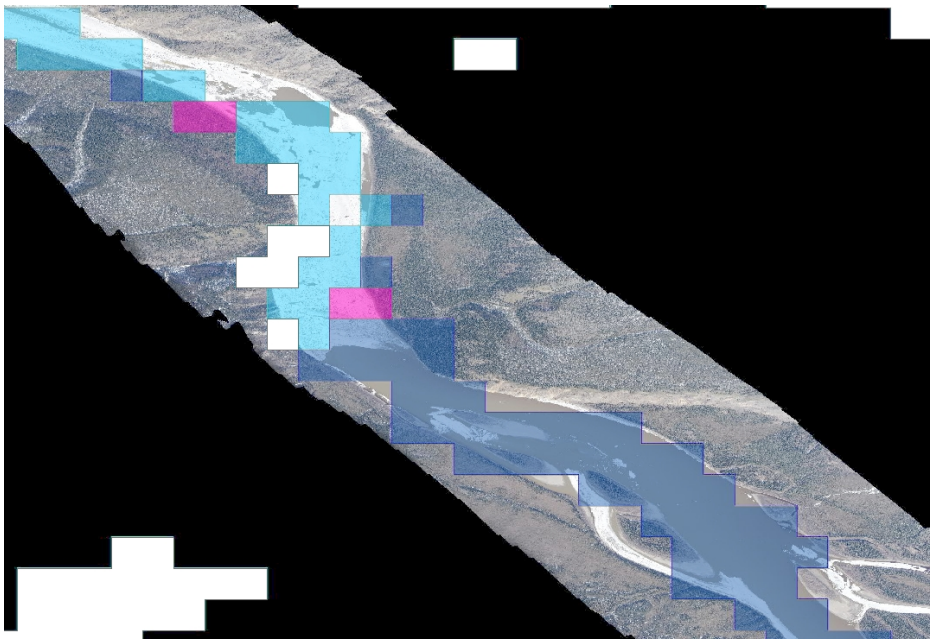

Figure 9: A comparison with the JPSS Proving ground satellite based ice/flood product and Yukon river aerial imagery.

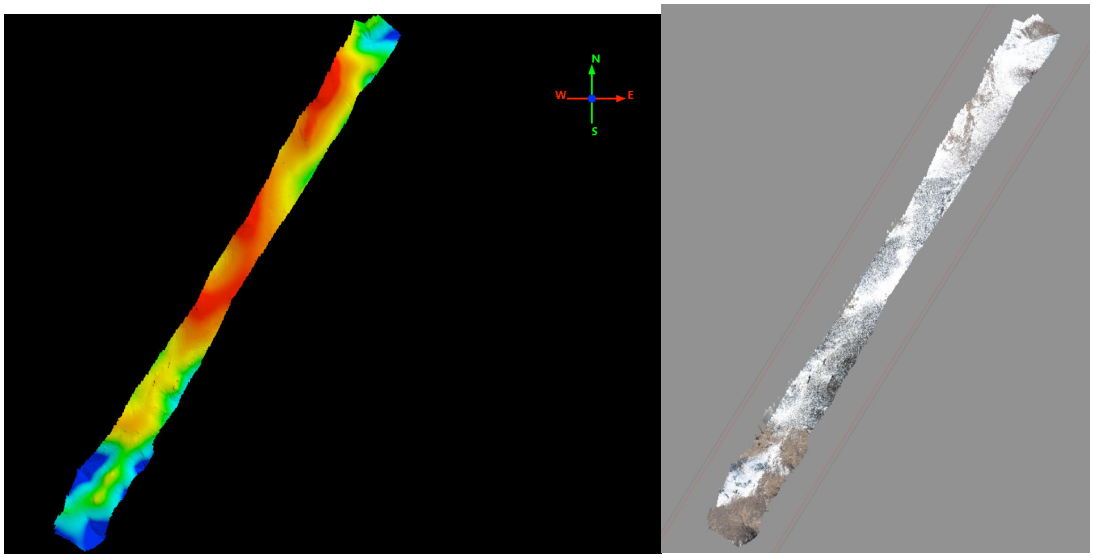

Figure 10: One digital surface model and orthomosaic time slice from time series of snow depletion at NOHRSC flight line site. Surface model height changes are are being compared to gamma detection values collected by NOHRSC.