Fishing for answers in deglacial ribbon lakes
advances in Cordilleran paleogeographic, paleoenvironmental and isostatic reconstructions

Timothy Johnsen and Tracy Brennand, Simon Fraser University, British Columbia, Canada

Objectives
- Investigate, survey and correlate paleolake levels
- Reconstruct palolake geography, evolution and environment
- Reconstruct glacio-isostatic rebound

Why study these lakes?
- Deglacial ribbon lakes have rarely been studied beyond the reconnaissance level
- Abundant sediment exposures and shoreline features are in the study area
- Most glacial lake research has been completed for the low relief setting of the Laurentide Ice Sheet. The study area is moderately high relief

How?
- Integrate a diversity of techniques: geomorphology, sedimentology, aerial photographs, differential GPS, GPR, DEMs and GIS

Paleogeography

Correlations

Narrow, long and deep
- Two palolake levels were identified
- Lakes were rhomboidal (width to length ratio of ~1:2), deep (~400 m), and of significant volumes (~44 and 24 km³)
- Lake to exist (Glacial Lake Dredmont) based stereographically, discharging ~90 km³. It is possible that this event may have occurred amidst the failure of glacial lakes. Immunology

Glacio-isostasy
- Glacio-isostatic tilt of these lake shorelines are among the highest measured in the world (1.3 ± 7.7 m km⁻¹)
- Causes: very thin (~35 km thick) and low viscosity lithosphere, paleo-topography of the CSL, rapid deglaciation, and the possible early development of these lakes
- Glacio-isostatic depression in this region was likely hundreds of metres

Catastrophic drainage
- Ice dam lake in the Cordilleran region
- Development of channel surfaces and drainage bedforms

Dynamic and energetic
- Deglacial environment whereby ice dominantly on plateaus, not valleys
- Ice dammed lake with numerous tributaries containing remnant ice masses in their headwaters
- High rates of sedimentation from tributaries that developed deltas, subsequent fans and high energy lake sediments
- Low energy deposits dominated by laminated silts. Classic varves not produced
- Buried ice producing collapsed sediments and kettle holes

Sedimentary facies
- Sometimes glaciolacustrine facies were identified (laminated sediments, homogenous debris, dikes, etc.)
- Tidal facies were identified in some cases, suggesting an estuarine setting

Deglaciation
- Correlation model of the lake levels across valleys in the study area
- Coseismic uplift and subsidence caused by glacial lake failures
- Correlation model of inferred lake levels across valleys in the study area
- Correlation model of inferred lake levels across valleys in the study area

Failures
- Large sedimentary failures at X and Y. These failures are likely the result of vertical movements of the CSL, which in turn may have catastrophic implications for the study of the lake levels and the evolution of the CSL.
- Correlation model of inferred lake levels across valleys in the study area
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