Ice-flow indicator compilation for the Cordilleran ice sheet

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Summary

Surficial geology at 1:3,500,000 scale maps in large areas of northern British Columbia (BC) do not exist and the current ice-flow indicator databases need to be updated and expanded for the Cordilleran ice sheet. In northern BC, many surficial geology data sets contain DEMs and aerial photos. The British Columbia Ministry of Energy and Mines (Mintek) and the British Columbia Geological Survey (BCGS) have received large aerial photo surveys (sheet flow images) that need to be understood for ice-flow indicator compilation. In 2010, Mintek and BCGS (Arnold, 2010) developed a Multi-Agency Initiative to map surficial geology in northern BC and produce data on glacial landforms and geomorphologic indicators of glacial ice flow. This project phase 1 (GEM 1) has been completed and a Cordilleran ice sheet ice-flow indicator compilation is now available.

Objective

The primary objective of this initiative was to build on the success of the ice-flow indicator compilation for BC, the first phase of the initiative is complete and existing and independent ice-flow indicator databases put forward for exploration methods, and their suitability to indicate unidirectional ice-flow features (e.g., McClenagan, 2005; Shaw et al., 2010). In this study, however, these two data types have been combined to create derived-stereo images.

Methods

Using DOWISS automated photogrammetry, a combination of existing airborne imagery (aerials or satellite-based) has been identified and utilised in the area of study within the Cordilleran ice sheet. The project phase 1 is divided into two parts: (1) compilation of the new images using DOWISS and (2) interpretation of the images to identify areas of interest.

The project included the following steps:

1. 30 m SRTM DEM, from the United States Government.
2. 1:70,000-scale airphotos, from the Government of BC; and
3. Digital stereo airphotos and derived-stereo orthophoto mosaics and Satellite Pour l’Observation de la Terre (Sentinel-2) images from the European Space Agency.

The second phase (currently underway) is focusing on areas of northern BC where there is a low spatial density of surficial geology data sets. The goal is to create a Cordilleran ice sheet ice-flow indicator database that can be used in future studies to better understand the Cordilleran ice sheet flow history and its impact on mineral exploration methods.

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The three sources of data displayed in 3D with examples of ice-flow features in the study area.

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