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Landform and sedimentary evidence of subglacial reservoir development and drainage along the southern margin of the Cordilleran Ice Sheet in British Columbia, Canada and northern Washington State, USA.

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The southern margin of the former Cordilleran Ice Sheet (CIS) in British Columbia, Canada and northern Washington State, USA, contains a number of deep (100s m) and long (100s km) structurally-controlled bedrock valleys. Valley fill characteristics in one such valley (Okanagan Valley, British Columbia) suggest abundant erosion and deposition by subglacial meltwater during the Late Wisconsin glaciation. Thus, this valley (and possibly others) can be considered a mega-scale tunnel valley. Bedrock and sediment drumlins occur on the walls of this mega-scale tunnel valley and on surrounding plateaus. These drumlin swarms are traversed by smaller bedrock/sediment tunnel valleys. This creates a regionally-continuous network of drumlin swarms and tunnel valleys linked together by mega-scale bedrock tunnel valleys along a distinct landform track.

Based on individual drumlin morphological and sedimentological characteristics, and on landscape continuity arguments, drumlins are demonstrably erosional features. Drumlin morphological characteristics and sediment flux continuity arguments suggest that both drumlins and tunnel valleys are best explained by regional-scale subglacial meltwater erosion. Recurring rejections of meltwater underbursts as valid drumlin-forming processes often cite the lack of an identified meltwater source for the inferred voluminous discharges. In southern British Columbia, a network of subglacial reservoirs developed in deep bedrock valleys such as Okanagan Valley. Their

development and subsequent drainage was aided by the pronounced bed topography of the CIS, high geothermal activity along structural faults and evidence of subglacial volcanism within inferred reservoir areas.

The ‘glaciated’ landscape of southern British Columbia may record evidence of voluminous production and storage of subglacial meltwater. Erosion and deposition by subglacial underbursts took place during reservoir drainage. Reconstructed processes are consistent with current conditions of subglacial water bodies beneath modern ice sheets such as Antarctica. Implications of reservoir development and drainage on ice sheet geometry are also explored.