



What controls esker formation on the Canadian Prairies?

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Compared to the Canadian Shield, the Alberta prairie contains only a few, small eskers. Research has attributed this paucity to active ice sheet retreat, preferential development of canals rather than R-channels on deformable beds, and/or high permeability of substrate limiting the formation of R-channels. Based on their distribution, size, shape, morpho-sedimentary relationships and association with substrate, and topography we make several conclusions. (1) Esker pattern and the absence of systematic recessional moraines indicate that the hydrologic system recorded by eskers formed under regionally stagnant ice. (2) The presence of eskers on soft bedrock or fine-grained till contradicts the contention that R-channel drainage is precluded on a deformable substrate. (3) The association of large eskers, large lake basins and tunnel channels indicates that esker formation and preservation was facilitated by a ready sediment supply from antecedent tunnel channel fills and fans, hydraulic damming by glacial lakes or reservoirs, and decanting of meltwater from other lake basins. (4) Where an association with tunnel channels and large lakes is absent, the chaotic distribution/pattern and the prevalence of faulting and deformation within eskers indicate that eskers formed from short-lived and unstable R-channels.