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Giant glacial cirques of non-mountainous terrains

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Cirques are usually considered as specific landforms of hill and mountain terrains produced by alpine glaciers, and/or slope failures (landslides).

However, glacial cirques seem to be present also in non-mountainous terrains that underwent extensive Pleistocene ice-sheet glaciations and strong glacial and fluvio-glacial erosion. The largest form in the Baltic region is Severoladozhsky (North Lake Ladoga) cirque, probably the world's largest representative, with the length and width close to 100 km. Another example is the deepest Landsort basin of the Baltic Sea. In those cases Meso-Neoproterozoic sediments were subject to selected erosion, with evident overdeepening of the bedrock surface in comparison with surrounding crystalline frame. The bowl headwall shape of the cirque-like landforms was determined by the outline of the margin of exhumed basin.

The origin of the major basins of margins of the Baltic and Canadian shields are similar. However, direct analogues of giant cirques are not well developed in this part of North America due to geological deviations and dominant directions of ice movement. Comparable landforms (like the South Chippewa basin of the Lake Michigan) are therefore less mature.

We define glacial cirque as an amphitheatre-shape depression with comparable values of length and width, steep headwall with adjacent side slopes and gentle lip with commonly increased glacial accumulation. They are usually located within an ice stream that created typical relief profile with normal horseshoe overdeepening, and in areas predefined by geological and geomorphological peculiarities.

This definition likely fits both classic mountain cirques, and giant ones created in favorable conditions in domains that underwent extensive glaciations and relevant selective glacial erosion. Length/width ratio typical for giant cirques group is close to 1:1, being comparable with classical alpine ones. Major differences (like length/height ratio of other order and possible larger internal landscape complications) are related to the extreme size of typical representatives of giant cirques of non-mountainous terrains.