Most bedrock lithologies in the southern Appalachian Mountain region of Quebec are ideal for taking and preserving glacial striations. Merging data from over 900 outcrops in this region has led to the development of a regional ice flow history based on multiple striation directions, two or more often preserved on the same outcrop. At each striation site, a chronological identifier was assigned to each direction encountered, whether or not direction and age relationships were unequivocal. The large number of outcrops that bear striations with clear directional indicators and unequivocal age relationships make the relative age determinations very reliable. Given the considerable relief and outcrop-scale roughness of the glacial bed in this area, there was surprisingly little evidence of even minor deflections of flow by either large-scale or small-scale topography. Although instances of as much as 90° of flow deflection were noted on individual outcrops, these were extremely rare, occurring on less than 1 percent of the outcrops examined. In addition to the detailed history of ice flow events revealed, the distribution of different directions in valleys and uplands and on individual outcrops yields insights into the behaviour of the striating ice.

There are seven distinct striation events or phases documented from this area, and they are, from oldest to youngest: 1) southwestward (~220°), 2) southeastward (135±5°), 3) east-southeastward (100±10°), 4) southeastward (135±10°), 5) northward (000±10°), 6) northwestward (340±10°) or northeastward (030±15°), and 7) east-southeastward (090-110°).

Though Wisconsinan-age deposits comprise two packages of glacial and proglacial sediments in this region, the earliest being deposited during the Chaudière Glaciation and the latest during the Lennoxville Glaciation, all but the first southwestward and southeastward striae (phases 1 and 2) are thought to have been formed under Lennoxville ice.

Late in the Lennoxville Glaciation, ice flow from north of the St Lawrence River was deflected down the St Lawrence Valley, cutting off ice supply south of the River and creating a remnant ice mass in which the east-west-trending Quebec Ice Divide developed, north of which flow was northward, toward the St. Lawrence Valley. Glacial striae indicating flow toward 000° (±10°) (phase 5) are ubiquitous north of the divide. The southeastward striae of phase 7 are thought to have formed when Laurentide ice readvanced to the Highland Front Moraine position and up the Chaudière Valley during a late glacial pulse.
Navigating Past & Future Change
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