Glacial Features of the Appalachian/Piedmont

Region 2

Glacial Scouring

Glacial scouring, resulting from the scraping action of the glacial sediments, have formed two classic glacial features in the Appalachian/Piedmont region: potholes and lake basins. Archbald Pothole State Park near Scranton, Pennsylvania is one of the largest glacier-scoured ***potholes*** in the world, measuring approximately 13 meters wide and 12 meters deep. While not always caused by glacial runoff, smaller potholes are found throughout the once glaciated areas of the Appalachian/Piedmont as well as other regions of the Northeast.

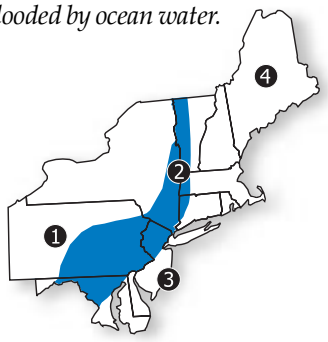
In the Appalachian/Piedmont, the glaciers of the Laurentide ice sheet scoured and the meltwater flooded two major lake basins: Lake Champlain and the former glacial Lake Albany. The edge of Lake Champlain was 15-30 kilometers east of its present shoreline during the ice age. The shoreline once extended as far east as the Green Mountains (and in some areas even beyond). Examination of the ancient shorelines left by the glacial Lake Champlain shows clear evidence for rebound of the land after the removal of the ice sheet. More than 150 meters of rebound is evident by looking at the once horizontal shorelines of glacial Lake Champlain. The Champlain Lowlands, with their low elevation and minimal relief, show the extent of the glacial Lake Champlain. Fourteen thousand years ago, the receding glaciers caused a rise in ocean levels. Because northern New England was just becoming ice-free, the crust was still depressed, not having had enough time to rebound. As a result, the St. Lawrence Seaway and Lake Champlain were flooded with encroaching ocean waters. Thus, it is not surprising that marine ***fossils*** were found in the lakebed sediments, such as Vermont's state fossil, the Charlotte Whale.

The Hudson River Valley, also deepened and broadened by the ice sheet advance, was likewise flooded when the glaciers began to melt. Glacial Lake Albany was formed when the lowlands flooded, though the lake does not exist today. *Evidence* of the lake does exist, however. The glacially scoured, narrow and deep Hudson River is a ***fjord***, similar to the fjords of the Netherlands. Ocean water extends up the river valley with the tides as far north as Poughkeepsie, New York.

In order to form such an enormous **pothole**, *scouring conditions must last for quite some time.*

see Fossils, p.98, for other ice age **fossils.**

A **fjord** *is a deep and narrow, glacially scoured valley that is flooded by ocean water.*



Glaciers

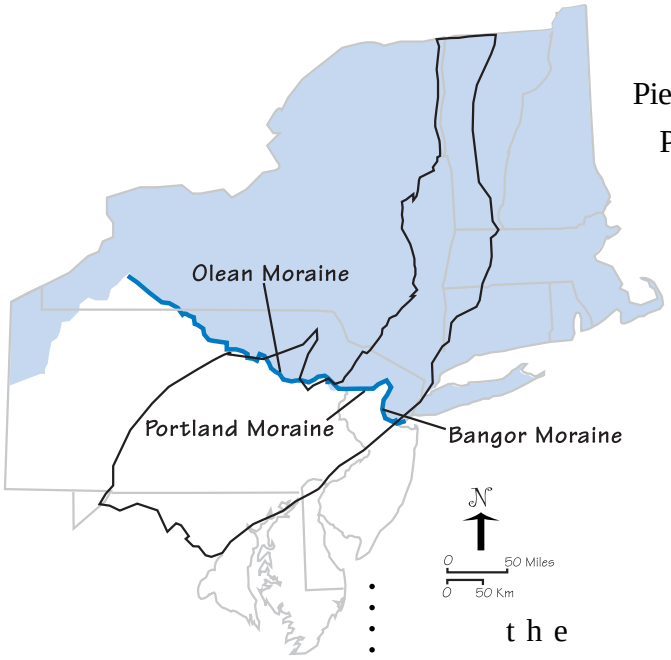


Figure 3.14: Terminal moraines of the Appalachian/Piedmont. Light blue represents the maximum extent of the most recent ice sheet.

Glacial Deposits

The most significant glacial deposits in the Appalachian/Piedmont region are the moraines that stretch across northern Pennsylvania and New Jersey *(Figure 3.14)*.

Periglacial Features

The steep, mountainous topography of the Appalachian/Piedmont aided the glaciers in speeding up physical weathering of the rocks in the periglacial region *(Figure 3.15)*. Boulder fields, some deeper than 3 meters, formed when blocks of rock from nearby ridges were loosened by freezing and thawing water in fractures and cracks. The boulders tumbled down slope and were left as fields of rocks. The majority of boulder fields occur in the periglacial Appalachian/Piedmont region of Pennsylvania and Maryland. Some of the best examples of boulder fields in Pennsylvania include Hickory Run in Carbon County; Blue Rocks in Berks County; Ringing Rocks in Bucks County; and Devils Race Course in Dauphin County. There are many smaller boulder fields as well throughout the Appalachian/Piedmont in Maryland and Pennsylvania.

Another periglacial feature found in the Appalachian/Piedmont region are ice wedges. In northern New Jersey, ice wedge casts created polygonal patterns in the ground. The polygons range in diameter from 3-30 meters. When the ice melted, the wedges filled with sediment from glacial meltwater. The sediments in the cracks are able to hold more moisture, and thus are a better medium for plant growth. The polygon patterns were first recognized in agricultural fields because the crops grew much better in the wedge sediments than the surrounding sediments.

The Appalachian/Piedmont periglacial region also has evidence of solifluction. Becoming increasingly heavier with water from thawing in the periglacial environment, soils began to flow rapidly down slope in many areas.

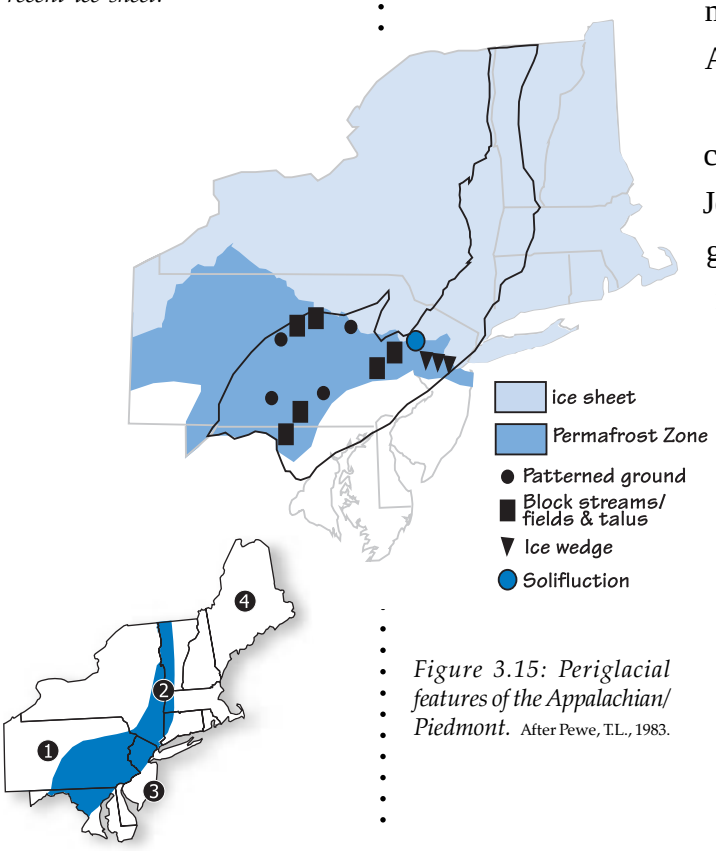


Figure 3.15: Periglacial features of the Appalachian/Piedmont. After Pewe, T.L., 1983.