The Erosion of Pilot Mountain: How Long Will it Take?

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Abstract

Pilot Mountain, located in Mount Airy, North Carolina, is a popular tourist attraction, but it is also of geographic importance. Pilot Mountain is a monadnock, an erosion remnant that was left behind after great tectonic movements shaped the Appalachian Mountains. The Alleghanian Orogeny involving Laurentia and Gondwana, forced beach sands, containing quartz, under Laurentia causing a great uplift that formed the Appalachian Mountains. Pilot Mountain has a solid core of quartzite, which is 98 percent pure quartz, probably from the lithification of the quartz in the beach sand during the Alleghanian Orogeny. The monadnock we call Pilot Mountain, wasn't eroded away with the surrounding rock, because its internal quartzite structure is so stable. Quartz is one of the most stable rocks because the separate molecules in quartz don't have any valence electrons, and because of this it takes an extensive amount of time to erode away. This research paper will cover the formation of Pilot Mountain, quartz structure and erosion rates, and the amount of time it will take Pilot Mountain to completely erode away.