



# The Geoheritage of Mount Ararat and its Vicinity: An Assessment of Geodiversity with a Focus on Glaciation and Mountaineering

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## Abstract

Mount Ağırı (Ararat), located at the intersection of Turkey, Iran, and Armenia, is a region of exceptional geodiversity where iconic volcanic and glacial processes converge. In response, this study offers a systematic assessment of the geoheritage of Mount Ararat and its vicinity. By identifying, classifying, and prioritizing its key geosites, it aims to provide a structured knowledge base to support future conservation and sustainable geotourism initiatives. Using Brilha's (2016) methodology, geosite and geomorphosite scores were assessed for sixteen key locations, supported by SWOT analysis, Last Glacial Maximum paleo-ELA estimations, and glacier retreat studies. High scientific and cultural values are evident in preserved glacial landforms, eruptive vents, and archaeological-historical features, while the mountain's global symbolism and mountaineering appeal enhance its geoheritage potential. Strengths include the preservation of rare geomorphology, high geodiversity, and geotourism opportunities. Weaknesses highlight limited research, inadequate infrastructure, and environmental pressures from uncontrolled mountaineering and pack animals, as well as overtourism driven by excessive visitor numbers. Opportunities arise from potential geopark designation, cross-border scientific collaboration, and sustainable tourism initiatives, whereas threats involve climate-driven glacier retreat, natural hazards, and security restrictions in the border zone. The scoring results underline Ahura Valley, Summit Glaciers, and Noah's Ark Site as priority geosites, with high scientific and cultural relevance but varying degradation risks. Overall, this assessment demonstrates that Mount Ağırı offers significant opportunities for integrating geoheritage conservation, scientific research, and sustainable geotourism, provided that management strategies address the identified environmental, political, and safety challenges.

**Keywords** Geoheritage assessment · Geotourism · Geopark · Glacial tourism · Ağırı dağı - mount ararat

## Introduction

Geodiversity, the natural variety of Earth's abiotic components, forms the structural framework of landscapes and ecosystems and underpins geoheritage features of scientific, educational, and cultural value. It encompasses the variety

of rocks, minerals, fossils, soils, landforms, and geological processes within a site (Gray 2004). Unlike single features, geodiversity may cover an entire area or region containing numerous geological and geomorphological elements. Geoheritage is defined by the scientific, educational, cultural, and aesthetic values of geodiversity. These values are concretized in specific geosites, which constitute significant geoheritage assets. However, these assets are often at risk, and their degradation would cause the permanent loss of crucial geological information. These geosites include landforms, rocks, minerals, fossils, stratigraphic structures, fault lines, and water and soil properties that possess outstanding scientific, educational, cultural, or aesthetic value and therefore require preservation for future generations (Zouros 2007; Reynard et al. 2007; Gray 2013; Brilha 2016; Coratza et al. 2021; Turoğlu 2025). As an umbrella concept, geoheritage provides the rationale for creating specific protective

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