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ANALYSIS OF CHANGES IN THE UPPER FOREST BOUNDARY OF THE KEY AREAS
IN THE REPUBLIC OF ARMENIA OVER THE PAST 130 YEARS

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The upper treeline is an important ecotone that is sensitive to climate change and anthropogenic impacts. Under conditions of global warming, its upward shift is expected in mountainous regions. The study was conducted at four sites in the Republic of Armenia, differing in landscape characteristics, altitudinal zones, and forest species composition: Dilijan National Park, Stepanavan Arboretum, Artanish Peninsula (Lake Sevan), and Araiiler Volcano. Analysis of data over a 130-year period revealed the absence of a clear overall trend toward an increase or decrease in the upper forest line. Localized changes were identified in all key areas, driven by geographic factors: a downward retreat of the treeline by 30–50 m (primarily on Southwestern slopes) in some areas was caused by intensive grazing, localized clearing, and erosion. An upward advance of 20–100 m (especially on Northern and Northeastern exposures) was primarily due to reforestation, reduced anthropogenic pressure, and the advance of the tree and shrub layer along hollows and depressions. Microrelief played a special role: it had a key influence on the development of shrubs in areas near the upper treeline. Shrubbing became the most visible process in terms of ecotone dynamics. The dynamics of the upper treeline in the studied areas are predominantly local and heterogeneous. It is determined by a complex interaction of geographic factors – climatic trends, topographic features, microclimatic conditions, and anthropogenic impact. The combination of field methods with remote sensing data analysis allowed for a detailed interpretation of the complex processes occurring at the upper forest line, identifying the dominant causes of change, and assessing the role of individual factors in shaping the current ecotone structure.

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