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Ecological properties of vegetation formations on karst terrains in the central Taurus Mountains (Southern Turkey)

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Abstract

There is a strict relationship between the formation of karst topography, soils and vegetation on karst terrains. The Central part of Taurus Mountains of southern Turkey is rich in terms of topographical variety and karstic landforms. Karst topography has a strong influence on the development of soil types and vegetation formations. Karst formations such as karren, doline, uvala, karstic valley and poljes create unique habitats with different micro-climatic, soil and vegetation characteristics that differ from neighbouring sites.

Keywords: Ecology; vegetation formations; karst terrains; Taurus Mountains; Turkey.

1. Introduction

The relationships between topography, soil formation and vegetation distribution have been studied in karstic terrains by several scholars (e.g., Atalay, 1988, 1991, 1997; Cvijic, 1924; Efe, 1998, Barany-Kevei, 1983, 1987, 1999, Barany and Horvath 1996). The development of soils and successional evolution and establishment of vegetation in karst terrains are primarily affected by physical and chemical properties of limestone occurring in the study area (Atalay et al. 2008; Atalay and Efe 2008; Efe 2004). And, more specifically, the characteristics of

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vegetative cover are also dependent on dominant environmental conditions – especially the soil and climatic parameters being demonstrated on karstic terrains (Atalay and Efe 2010; Atalay and Efe 2011; Efe et al., 2008).

The study area is located within the northeast Mediterranean Basin in southern part of Turkey. In particular, this study is concerned with the relationships between geomorphology, soils and vegetation in the central part of the Taurus Mountains, specifically in the area between Ermenek, Gülnar, Hadim and Mut. The primary objectives of this work are to determine the scope of karst landforms, soil, and vegetation and to provide a description and explanation of their interrelationships.

Fig. 1. Study area

Distinctive climatic characteristics of the region include a hot, dry high-sun season, and a mild, wet low-sun period. The average monthly temperatures during the summer season can be as high as 27°C.

Temperatures in January are mild and the average between 7-10°C. Total annual precipitation ranges from 700 to 1,500 millimetres. More than half of the precipitation falls during winter and the rate varies with altitude. Overall, the Mediterranean region of Turkey is marked by an Alp-Himalayan orogenic system exhibiting high, folded, faulted, rugged mountains and hills often abruptly rising from the coast of the Mediterranean Sea. The geomorphology of the Taurus Mountains developed as a result of on-going tectonic and fluvial processes in the Late Tertiary and Quaternary periods. But, climate determines the mode and speed of external processes that are modifying the landscape. In summary, the geomorphic units in the Mediterranean region of Turkey can be considered to be shaped by tectonics, climate, and fluvial processes.

2. Findings

Close relationships have been observed between karst geomorphology soil types and vegetation in the Central Taurus Mountains. The lithologic properties of limestone, the thickness of rock layers, slope gradients, the depth of impermeable layers, and hydrologic properties are important contributors to the development of karst topography. The limestones belonging to the Jurassic, Cretaceous and Miocene eras have been deposited in a marine environment through a number of processes: detritically as gravel, sand and mud; partly by chemical deposition; and partly by organic processes.