

## Impacts of Present and Future Climate Variability on Forest Ecosystem in Mediterranean Region

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**Abstract :** Climate change is largely recognized as one of the real, pressing and significant global problems. The concept of 'climate change vulnerability' helps us to better comprehend the cause/effect relationships behind climate change and its impact on human societies, socioeconomic sectors, physiographical and ecological systems. In this study, multifactorial spatial modeling was applied to evaluate the vulnerability of a Mediterranean forest ecosystem to climate change. As a result, the geographical distribution of the final Environmental Vulnerability Areas (EVAs) of the forest ecosystem is based on the estimated final Environmental Vulnerability Index (EVI) values. This revealed that at current levels of environmental degradation, physical, geographical, policy enforcement and socioeconomic conditions, the area with a 'very low' vulnerability degree covered mainly the town, its surrounding settlements and the agricultural lands found mainly over the low and flat travertine plateau and the plains at the east and southeast of the district. The spatial magnitude of the EVAs over the forest ecosystem under the current environmental degradation was also determined. This revealed that the EVAs classed as 'very low' account for 21% of the total area of the forest ecosystem, those classed as 'low' account for 36%, those classed as 'medium' account for 20%, and those classed as 'high' account for 24%. Based on regionally averaged future climate assessments and projected future climate indicators, both the study site and the western Mediterranean sub-region of Turkey will probably become associated with a drier, hotter, more continental and more water-deficient climate. This analysis holds true for all future scenarios, with the exception of RCP4.5 for the period from 2015 to 2030. However, the present dry-sub humid climate dominating this sub-region and the study area shows a potential for change towards more dry climatology and for it to become a semiarid climate in the period between 2031 and 2050 according to the RCP8.5 high emission scenario. All the observed and estimated results and assessments summarized in the study show clearly that the densest forest ecosystem in the southern part of the study site, which is characterized by mainly Mediterranean coniferous and some mixed forest and the maquis vegetation, will very likely be influenced by medium and high degrees of vulnerability to future environmental degradation, climate change and variability.

**Keywords :** forest ecosystem, Mediterranean climate, RCP scenarios, vulnerability analysis

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