

The spatio-temporal changes of rangelands in the European Mediterranean are analysed with remote sensing and GIS-based methods, referring to an example of two mountain ranges in central Crete, Greece. The focus is to monitor and assess land degradation and its potential correlation with ecological and socio-economic boundary conditions. Particular attention is paid to the unique European Mediterranean setting and the Greek integration within the European Union.

After a geometric correction of the satellite data, a radiometric pre-processing chain is employed to calculate reflectance values via a DEM-based atmospheric correction. The computation of pixel-wise soil and vegetation fractions is based on a spectral unmixing approach. A subsequent time-series analysis reveals spatially explicit trends, mean vegetation cover and phenological variability.

Results do not only exhibit significant differences between the two test sites, but also within the respective regions. In both mountain ranges extended areas with degrading vegetation patterns are revealed. However, along the Southern Cretan coast those processes are bound to a much lower base level of vegetation cover. Beyond trends and mean vegetation abundance, the phenological variability is another important figure which is employed to characterise plant communities from space. Moreover, a satellite-based map of soil development proves the correspondence between soil and vegetation degradation processes.

Vegetation cover and change are then analysed with regard to aspect, slope, elevation and geological substrate to allow for a comparison of vegetation degradation and natural boundary conditions. In a second step, the analyses are extended to find interrelationships with socio-economic determinants. Based on these results the degradation risk for the grazing habitats of central Crete is assessed in differentiated ways. We neither encounter the scenario of irreversible degraded rangelands, nor a cultural landscape in an equilibrium under intense human influence.