Abstract Medecos 2017

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2016 Aug

# Title:

option title 1

**Greenness's resilience of *Quercus pyrenaica* forests to two extreme drought events: A study case from Sierra Nevada (southern Spain)**

option title 2

**Resilience of the greenness of *Quercus pyrenaica* forests of Sierra Nevada (southern Spain) to two consecutive extreme drought events**

option title 3 **Resilience in the functioning of *Quercus pyrenaica* forests of Sierra Nevada (Southern Spain) after two successive extreme drought events**

## Authors

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## Abstract

Climate change projections predict an increase in the frequency of extreme events (e.g. droughts). This increase could result in reduced resilience of ecosystems, particularly in populations located in the rear edge of their distribution.

In this work, we evaluate the drought impacts in the greenness of Quercus pyrenaica forests in Sierra Nevada, a Mediterranean high-mountain (southern Spain). Summers 2005 and 2012 were two of the worst drought episodes ever recorded in this area. Our main objectives were: *(i)* to evaluate how each drought event has affected the greenness of this forest type; *(ii)* to analyze the resilience, resistance and recovery of this ecosystem to successive extreme drought events; and *(iii)* to explore differences in the resilience between populations located in southern and northern slopes.

We used Enhanced Vegetation Index (EVI) data derived from MODIS-MOD13Q1 product to characterize vegetation greenness during the period 2000-2015. We calculate EVI monthly anomalies for each drought event (2005 and 2012) in relation to a reference period. Resistance, recovery and resilience of the forest greenness to each drought event were also calculated.

Vegetation greenness of 2005 and 2012 were lower than the greenness observed in the reference period, especially for late-spring and summer. The drought of 2005 impacted more deeply to vegetation greenness than the 2012 drought. A substantial reduction of EVI greenness was observed during 2005 summer.

Reduction in EVI was higher in northern populations than southern ones. Significant differences were found on resilience between northern and southern populations, with southern behaving as more resilient.