High-resolution spatial assessment of vegetation shifts in Portugal since 1982

Patrícia Páscoa (1), Célia M. Gouveia (1,2), Ana C. Russo (1), Ricardo M. Trigo (1), and Sergio M. Vicente-Serrano (3)

(1) FCiências.ID – Associação para a Investigação e Desenvolvimento de Ciências, Instituto Dom Luiz, IDL, Lisboa, Portugal (ppramos@fc.ul.pt), (2) IPMA, Lisboa, Portugal, (3) Instituto Pirenaico de Ecología, CSIC, Zaragoza, Spain

Vegetation trends in Portugal point to a generalized greening in this territory in the period 1982-2012, in agreement with global greening patterns. Nonetheless, vegetation dynamics may be altered by natural hazards, such as fires and droughts, and also by human activities like land management and land use change. The identification of trend shifts allows to better understand their impacts on vegetation, as well as the recovery after these disturbances.

A recently developed a high-resolution (1.1km) spatial dataset of the Normalized Difference Vegetation Index (NDVI) for Portugal spanning the period from 1981 to 2015 is used in the present work. NDVI was derived from the Advanced Very High Resolution Radiometer (AVHRR) sensor on board of the NOAA satellites. Land cover and land cover change are identified using CORINE Land Cover maps. Trends are assessed on seasonally adjusted NDVI time series. Results show at least one breakpoint in the NDVI time series over the study area. Moreover, the majority of the breakpoints separate segments of increasing trend, indicating the recovery of the vegetation after the disturbance. In particular, the extreme drought event of 2005 is pointed out as one main cause of the vegetation shifts occurring, namely in central and southern Portugal, highlighting that water availability plays a major role in vegetation activity in these areas. Additionally, the 2005 fire season presents the second highest value of burned area during the study period, and it is also responsible for a significant number of vegetation shifts. Vegetation behaviour and recovery over the areas affected by drought and/or fires are analysed. Land cover change is also a likely driver of vegetation shifts, since they are both identified on a pixel level on some regions.