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Vegetation recovery assessment following large wildfires in the Mediterranean Basin

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Mediterranean ecosystems have evolved along with fire, adapting to quick recovering following wildfire events. However, vegetation species respond differently to the changes in fire regimes that have been observed in the past decades in the Mediterranean. These changes, which occurred mainly due to socio-economic and climatic changes, led to dramatic modifications of landscape composition and structure (Malkinson et al., 2011). Post-fire vegetation recovery depends on environmental factors such as landscape features and climatic variables and on specific plant traits; however it also depends on the differentiated response of each species to the characteristics of fire regimes, such as recurrence, severity and extent. The complexity of the interactions between these factors emphasizes the importance of assessing quantitatively post-fire recovery as well as the role of driving factors of regeneration over different regions in the Mediterranean.

In 2006, Spain experienced the fire season with larger fires, restricted to a relatively small region of the province of Galicia, that represents more than 60% of total burned area of this fire season (92000ha out of 148827 ha). The 2007 fire season in Greece was remarkably severe, registering the highest value of burnt area (225734 ha) since 1980. Finally, in 2010 a very large wildfire of about 5000 ha occurred in Mount Carmel, Israel, with major social and environmental impacts.

The work relies on monthly NDVI data from SPOT/VEGETATION at 1km spatial resolution over the period from September 1998 – August 2011 for Spain, Greece and Israel. Here we have applied the same sequential methodology developed at our laboratory, starting by the identification of very large burnt scars by means of a spatial cluster analysis followed by the application of the monoparametric model (Gouveia et al., 2010; Bastos et al., 2011) in order to study post-fire vegetation dynamics. Post-fire recovery times were estimated for burnt scars from each fire season considered in this study. The influence of driving factors such as pre-fire land-cover type and fire damage on vegetation recovery was assessed by means of a spatial analysis on recovery time fields. Finally, post-fire behaviour of vegetation over the selected regions and the role of the driving factors were compared. This work draws attention to the fact that the simple model applied by Bastos et al. (2011) to monitor vegetation recovery in Portugal following large wildfires is still applicable over other Mediterranean regions using coarse resolution remotely sensed data.

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