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Forest fires caused by lightning activity in Portugal

Ana Russo (1), Alexandre M. Ramos (1), Akli Benali (2), and Ricardo M. Trigo (1)

(1) Universidade de Lisboa, Fundação da Faculdade de Ciências da Universidade de Lisboa, Instituto Dom Luiz (IDL), Lisbon, Portugal (acrusso@fc.ul.pt), (2) Universitdade Lisboa, CEF - Centro de Estudos Florestais, ISA, Lisbon, Portugal

Wildfires in southern Europe have been causing in the last decades extensive economic and ecological losses and, even human casualties (e.g. Pereira et al., 2011). According to statistics provided by the EC-JRC European Forest Fires Information System (EFFIS) for Europe, the years of 2003 and 2007 represent the most dramatic fire seasons since the beginning of the millennium, followed by the years 2005 and 2012. These extreme years registered total annual burned areas for Europe of over 600.000 ha, reaching 800.000 ha in 2003. Over Iberia and France, the exceptional fire seasons registered in 2003 and 2005 were coincident respectively with one of the most severe heatwaves (Bastos et al., 2014) and droughts of the 20th century (Gouveia et al., 2009). On the other hand, the year 2007 was very peculiar as the area of the Peloponnese was struck by a severe winter drought followed by a subsequent wet spring, being also stricken by three heat heaves during summer and played a major role increasing the susceptibility of the region to wildfires (Gouveia et al., 2016).
Some countries have a relatively large fraction of fires caused by natural factors such as lightning, e.g. northwestern USA, Canada, Russia. In contrast, Mediterranean countries such as Portugal has only a small percentage of fire records caused by lightning. Although significant uncertainties remain for the triggering mechanism for the majority of fires registered in the catalog, since they were cataloged without a likely cause.
In this work we have used mainly two different databases: 1) the Portuguese Rural Fire Database (PRFD) which is representative of rural fires that have occurred in Continental Portugal, 2002–2009, with the original data provided by the National forestry Authority; 2) lightning discharges location which were extracted from the Portuguese Lightning Location System that has been in service since June of 2002 and is operated by the national weather service - Portuguese Institute for Sea and Atmosphere (IPMA).
The main objective of this work was to evaluate and quantify the relations between the wildfires' occurrence and the lightning activity. In particularly we were able to verify if wildfires which were identified as "ignited by lightning" by comparing its location to the lightning discharges location database. Furthermore we have also investigated possible fire ignition by lightning discharges that have not yet been labeled in the PRFD by comparing daily data from both datasets.

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