



Electrical characteristics and environmental conditions of lightning-ignited fires in the Iberian Peninsula and Mediterranean France between 2009 and 2015

Francisco J. Pérez-Invernón¹, Heidi Huntrieser¹, Sergio Soler Lopez², Francisco J. Gordillo-Vázquez², Javier Navarro-Gonzalez³, Victor Reglero³, Joan Montanyà⁴, and Oscar A. van der Velde⁴

¹Deutsches Zentrum für Luft- und Raumfahrt, Institut für Physik der Atmosphäre, Wessling, Germany (franciscojavier.perez-invernon@dlr.de)

²Instituto de Astrofísica de Andalucía (IAA), CSIC, Granada, Spain

³Astronomy and Space Science Group, University of Valencia, Valencia, Spain

⁴Electrical Engineering Department, Polytechnic University of Catalonia, Terrassa, Spain

About 5% of the wildfires in the Mediterranean basin are produced by lightning [1]. Lightning-ignited fires tend to occur in remote areas and can spread significantly before suppression. The occurrence of lightning-caused fires is closely related with intense drought periods and high temperatures [2]. Therefore, drier conditions and higher temperatures in a changing climate are expected to lead to a future increase in lightning-ignited fires occurrence. The development of a lightning-ignited fire parameterization for Earth system models arises as a necessary tool to predict the future occurrence of these extreme events and to study their impact on atmospheric chemistry.

Long Continuing Current lightning (LCC-lightning), preferable taking place in dry thunderstorms, is believed to be the main precursor of lightning-ignited fires. This was originally proposed by McEachron and Itagenguth in 1942 [3] working with laboratory sparks, which suggested that ignition by natural lightning is usually caused by a discharge having an unusual long-continuing current phase. Later in 1967 this hypothesis was confirmed by Fuquay *et al.* [4].

In this work, we analyse three fire databases of lightning-ignited fires in Spain, Portugal and Southern France between 2009 and 2015. Furthermore lightning measurements from the World Wide Lightning Location Network (WWLLN) and the Earth Networks Total Lightning Network (ENTLN), and land and atmospheric variables from the new ERA-5 reanalysis are combined to investigate the electrical characteristics and environmental conditions of the fires. This preliminary data analysis will be useful to set new relationships between the characteristics of thunderstorms and the initiation of wildfires. It is the first step towards the development of a detailed lightning-ignited fire parameterization for the atmospheric chemistry-climate model EMAC.

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[2] Pineda, N., and Rigo, T. (2017). The rainfall factor in lightning-ignited wildfires in Catalonia. *Agricultural and Forest Meteorology*, 239, 249-263.

[3] McEachron, K. B., and Itagenguth, J. It (1942), Effect of lightning on thin metal surfaces, *AIEE Trans.*, 61, 559-564, 1942.

[4] Fuquay, D. M., Baughman R. G, Taylor, A. R. and Hawe, R. G. (1967). Characteristics of seven lightning discharges that caused forest fires. *Journal of Geophysical Research*, 72 (24).