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The Impacts of the 2017 Catastrophic Fire Season in Portugal on Vegetation Productivity

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Wildfires have become a serious threat to ecosystems and human society over the last years of the 21st century, with many hectares being destroyed every year globally. The lengthening of the fire seasons and the increase of wildfires risk, which have been promoted by climate change, input many losses on society, economy and mostly in diverse ecosystems. In Portugal, the 2017 catastrophic fire season burned more than 450,000 hectares and caused the death of more than 100 people. In this context, relying on remotely sense products from MODIS collections, our study proposes an analysis of the effect of summer heat and water availability deficit in vegetation productivity decline that led to large fires propagation, especially in June and October of 2017. With the aim to evaluate the magnitude of the impact that compound or cascading extreme events had on the vegetation productivity decline, considering the 2001-2019 historical values, we defined three different classes of pixels that should reflect the conditions before the fire: affected by hot, by dry or by hot/dry conditions. Moreover, we assess the influence of favourable winter/spring meteorological conditions on enhancing vegetation productivity that promote high fuel accumulations susceptible to burn some months later. Our results reinforce the water and energy dependency of the vegetation of the region during the growing season and highlight that the combination of higher temperatures and water availability in spring can trigger summer wildfires propagation, flammability and intensity due to the accumulation of biomass. Considering that the example of 2017 can be more recurrent under the context of climate change, this study also highlights the need to improve the awareness strategies in fire prone regions like Portugal, especially on biomass accumulation control during growing season.

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