



Recent and future intense fire seasons in the Mediterranean basin: the increasing role of droughts and heatwaves

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Mediterranean ecosystems are prone to forest fires, as evidenced by several extreme fire seasons which struck in the last two decades, including both western (2003, 2005, 2017) and eastern (2007, 2018, 2021) Mediterranean sectors. These fire seasons had a massive impact on the economy and the environment, having also caused many human casualties, including 145 in Portugal 2017 and about 100 in Greece 2018. Moreover, it is now widely accepted that these outstanding fire seasons are often associated with unusually intense droughts and heatwaves (Turco et al., 2019; Ruffault et al., 2020). Additionally, there is strong evidence that the frequency of drought events in the Mediterranean basin has increased significantly in the last decades and is bound to increase further under different climate change scenarios (Tramblay et al., 2020).

The relentless tendency for increasing summer temperatures in Europe in recent decades, when compared to the last 500 hundred years, also underlines that the increment in temperatures is extensive to central and Scandinavian countries (Sousa et al., 2020), where forest fires have become considerably more frequent. Recent assessments have emphasised the synergy between drought and extremely hot summers in the Mediterranean (Russo et al., 2020).

In addition to this climate change scenarios point to a likely increase in the frequency of two specific heat-induced fire-weather types, precisely those that have been related to the largest wildfires observed in recent years (Ruffault et al., 2020). Heat-induced fire-weather types are characterized by compound dry and warm conditions occurring during summer heatwaves, either under moderate (heatwave type) or intense (hot drought type) drought. The frequency of heat-induced fire-weather is projected to increase by 14% by the end of the century (2071-2100) under the RCP4.5 scenario, and by 30% under the RCP8.5. In summary, these results consistently suggest that the frequency and extent of wildfires will increase throughout the Mediterranean Basin.

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