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Likely future changes in the conducive conditions to the extreme wildfire events in Europe.

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Abstract

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Abstract
The current global change is increasing the occurrence of extraordinary wildfires that overwhelm the suppression capacities, provoking substantial damages, and often resulting in human fatalities. Pyrocumulonimbus (PyroCb) development during convective fire-atmosphere interaction is a key factor causing these extreme and unpredictable wildfire events. There are still a lot of unknowns concerning the conditions conductive to PyroCb, but atmospheric instability together with hot surface conditions have been broadly accepted as key environmental factors triggering their occurrence. Although future scenarios point to an increase in global temperature worldwide, we still

need more precise information about how PyroCb conditions will change in the future at the continental scale. Here we analyzed the likely effect of climate change on the potential conditions conductive to PyroCb formation through the analysis of the Continuous Haines Index (C-Haines index) as a proxy of atmospheric instability, in combination with Fire Weather Index (FWI) as a proxy of near surface extreme climate conditions, during three period spans: historical period 1995-2014, near future: 2041-2060 and far future: 2081-2100 at the Pan European scale. We used monthly datasets of five general circulation models from the sixth phase of the Coupled Model Intercomparison Project (CMIP6) under SSP1-2.6, SSP2-4.5, and SSPP5- 8.5 scenarios. Our preliminary results point to a situation in which the concurrence of atmospheric instability and hot surface conditions will be more frequent than in the historical period. Our findings provide novel information about future conditions of extreme wildfires, which can help the preparedness of land-manager and policymakers to mitigate these likely dangerous fires.

Keywords: atmospheric variables, climate change, continuous haines index, fire weather index, pyrocumulonumbus.

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