



## Atmospheric Precursor of fire hazard: development of a fire-sentinel index for risk management in Abruzzo Region (Central Italy).

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About 10000 hectares of forest, corresponding to the 12% of the national forestry heritage, are lost each year in Italy due to arson or negligent fires. Consequences on ecosystem and natural equilibrium are relevant, since the time for the natural restoration process may take several decades. Climate extremes exacerbates Mediterranean area fire risk, due to prolonged drought conditions. On the other hand, hydrogeological risk is also expected to increase over burnt slopes, where surface runoff is incremented due vegetation loss. According to the current legislation, fire risk management is in charge of the Italian Regional Civil Protection, therefore the development of user-oriented tools, able to prevent the fire hazardous conditions, is key element to ensure the forest-fire risk management. In the proposed model, the atmospheric conditions preceding a forest fire are estimated through the combination of air temperature and relative humidity, as reference of atmospheric parameters. The approach assesses how many times the observed air temperature and RH of the previous 12 days area above the critical conditions (i.e., >25°C and < 50%, respectively). The model validation is carried out by using a three-years dataset of forest fires, that hit the Abruzzo region from 2018 to 2020, combined with meteorological data from civil protection gauges' network. The developed index identified fire-precursors in the 80% of selected case studies. The missing 20% is mainly related to the meteorological uncertainty in poorly gauged areas. Starting from the index validation, a pre-operational tool forced with ECMWF analyses is also described.