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Risk analysis of forest fires in Sicily, based on 2010-2023 observation period

Introduction.
Forest fires are complex phenomena causing significant damage to the environment and human health, habitat destruction, soil erosion, greenhouse gas emissions, and biodiversity loss. They are increasing globally, with extreme events becoming more frequent and destructive. Understanding their root causes and influencing factors is crucial.
Methods.
This work focuses on analyzing data of forest fires that occurred in the period 2010-2023 in Sicily, a big island with special orographic characteristics and substantial agricultural and forestry-pastoral activities. The methods concern a careful extraction of data by using QGIS software and official databases, and their appropriate statistical analysis.
Results.
A suitable definition of forest fire risk is formulated, and a risk ranking of Municipalities is obtained. Risk factors and their significance on risk are determined via multiple regression analysis with Box-Cox transformed dependent variable.
Conclusions.
The work shows an optimal balancing between ecological perspective and operational risk management. Forest fire data collection empowerment is highlighted, such as fire-starting location and total damage caused by each fire event. The study allows optimally distributing the Regional budget for forest fire prevention among the 390 Sicilian municipalities.

Special/ Invited session

Classification

Both methodology and application

Keywords

Environmental statistics; Forest fire risk management; Spatial statistics

Primary author: BARONE, Stefano (University of Palermo)

Co-authors: Dr PALADINO, Antonino; Prof. ORLANDO, Santo (University of Palermo)

Presenter: BARONE, Stefano (University of Palermo)

Track Classification: Data Analytics and Data Science: Case Studies