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# Fuel type characterization and potential fire behavior estimation in Sardinia and Corsica islands

V. Bacciu (1,2), G. Pellizzaro (3), P. Santoni (4), B. Arca (3), A. Ventura (3), M. Salis (1,2), T. Barboni (4), V. Leroy (4), D. Cancellieri (4), E. Leoni (4), L. Ferrat (4), Y. Perez (4), P. Duce (3), D. Spano (1,2)

(1) Euro-Mediterranean Center for Climate Changes, IAFENT Division, Sassari, Italy, (2) University of Sassari, Dipartimento di Scienze della Natura e del Territorio, Sassari Italy, (3) National Research Council of Italy, Institute of Biometeorology (CNR-IBIMET), Sassari, Italy, (4) SPE UMR 6134 CNRS – University of Corsica, Campus Grimaldi BP 52, 20250 Corte, France

Wildland fires represent a serious threat to forests and wooded areas of the Mediterranean Basin. As recorded by the European Commission (2009), during the last decade Southern Countries have experienced an annual average of about 50,000 forest fires and about 470,000 burned hectares. The factor that can be directly manipulated in order to minimize fire intensity and reduce other fire impacts, such as three mortality, smoke emission, and soil erosion, is wildland fuel. Fuel characteristics, such as vegetation cover, type, humidity status, and biomass and necromass loading are critical variables in affecting wildland fire occurrence, contributing to the spread, intensity, and severity of fires. Therefore, the availability of accurate fuel data at different spatial and temporal scales is needed for fire management applications, including fire behavior and danger prediction, fire fighting, fire effects simulation, and ecosystem simulation modeling.
In this context, the main aims of our work are to describe the vegetation parameters involved in combustion processes and develop fire behavior fuel maps. The overall work plan is based firstly on the identification and description of the different fuel types mainly affected by fire occurrence in Sardinia (Italy) and Corsica (France) Islands, and secondly on the clusterization of the selected fuel types in relation to their potential fire behavior. In the first part of the work, the available time series of fire event perimeters and the land use map data were analyzed with the purpose of identifying the main land use types affected by fires. Thus, field sampling sites were randomly identified on the selected vegetation types and several fuel variables were collected (live and dead fuel load partitioned following Deeming et al., (1977), depth of fuel layer, plant cover, surface area-to-volume ratio, heat content). In the second part of the work, the potential fire behavior for every experimental site was simulated using BEHAVE fire behavior prediction system (Andrews, 1989) and experimental fuel data. Fire behavior was simulated by setting different weather scenarios representing the most frequent summer meteorological conditions. The simulation outputs (fireline intensity, rate of spread, flame length) were then analyzed for clustering the different fuel types in relation to their potential fire behavior. The results of this analysis can be used to produce fire behavior fuel maps that are important tools in evaluating fire hazard and risk for land management planning, locating and rating fuel treatments, and aiding in environmental assessments and fire danger programs modeling.
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