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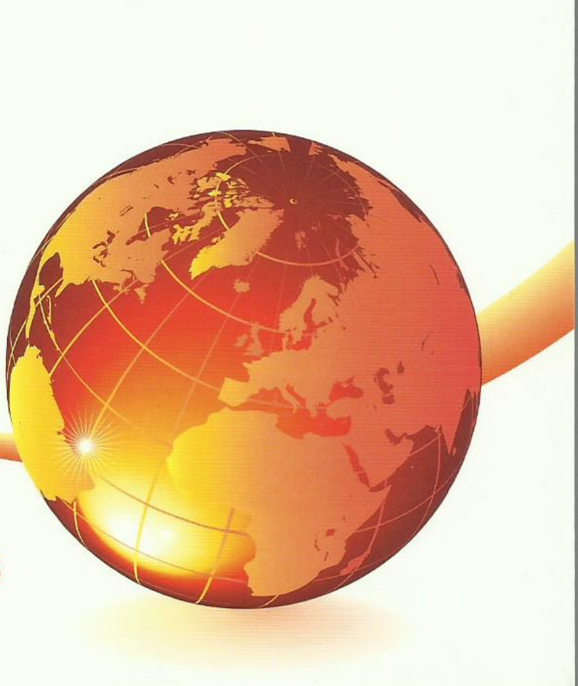
ABSTRACTS BOOK



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Measuring Fuel Moisture Content in Calabrian Pine (Pinus brutia) stands using four methods

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Fuel moisture is an important variable for forest fires because it affects fuel ignition and fire behavior. In order to predict fuel ignition potential, fire spread, fireline intensity and fuel consumption accurately, fuel moisture content must be assessed. Several methods are available for measuring the dead fuel moisture content. However, some methods have intrinsic problems/deficiencies with respect to the results obtained. This paper reports and discusses the differences in the results of the fuel moisture content measurements conducted in Calabrian Pine (Pinus brutia) stands using four different methods in Mugla province of Turkey. Measurements were carried out in 40 year old stand with normal stocking and closure. Prior to the measurements a fully automated weather station was set up at the study site to record weather variables, namely precipitation, temperature, relative humidity, and wind speed and direction. Five sampling plots were set up for fuel moisture measurements located at least 50 m away from the open areas to eliminate edge effect on fuel moisture. In each plot, four different measurement methods were employed. Measurement methods included i) six long moisture sticks measuring 25×1×0.3 cm, ii) grill shaped moisture sticks made up of twelve small sticks measuring each 10×0.5×0.1 cm, iii) meshed fuel samples for fine fine fuels and duff, and iv) direct sampling of litter and duff. Plastic containers were prepared 15x20 cm in size using nets with 1′1 mm mesh size. Litter and duff samples were taken and trays and moisture sticks were weighed every two hours with 0.01 gr precision from 09:00–19:00 for ten days in August. After weighing, sticks were carefully replaced back to where they were, and litter and duff samples were placed in plastic bags and taken to the laboratory and oven-dried at 105°C for 24 h and weighed to obtain fuel moisture contents. The study revealed several important results: i) while fine sticks, tray and litter and duff samples were all responsive to the changes in weather, long sticks were comparatively slower to respond. ii) fine sticks performed better in representing moisture changes throughout the day. This may be ascribed to the fact that samples measured were the same throughout the study. It may be argued that the results of the tray samples would also be the same as the same samples were measured. But, the analyses and field observations indicated that some fine fuel particles especially when dry fell out of the mesh and resulted in a decrease in the litter and duff. This caused an artificial increase in the moisture content of the samples contained within the tray. The litter and duff samples provided good approximation of fuel moisture contents, however, since the measurements involved different samples each time, there was a variation in the results. The results indicated that fine sticks can be used to easily and effectively determine the moisture contents of surface fuels. The results of the study will be of great importance in overall fire management planning.

Keywords: *Forest fires, Fuel, moisture content, Fire management*

Minimum travel time algorithm for fire behavior and burn probability in a parallel computing environment

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Fire management systems materialize the integration of fire science models and decision support planning modules. Their operational usage often requires the concurrent execution of a large number of fire growth simulations by multiple users. Intensive computations such as the creation of burn probability maps demand not only high expertise but also high computing power and data storage capacity. The purpose of this paper is to present some of the initial results of the AEGIS platform, which is a Web-GIS wildfire prevention and management information system currently under development. More specifically, the paper focuses on the utilization of the Minimum Travel Time (MTT) algorithm as a powerful fire behavior prediction system. MTT in AEGIS will be applied in a transparent way through its graphical user interface. Several end users will be able to conduct on-demand fire behavior simulations. To achieve this, end users must provide a minimum amount of inputs, such as fire duration, ignition point and weather information. Weather inputs can be either inserted directly or derived from selected remote automatic weather stations or forecasted weather data maps based on the SKIRON system (Eta/NCEP model). A seasonal burn probability map will be also prepared and provided to the end users. Socioeconomic data, weather predictions, topographic and vegetation data will be combined with artificial neural networks to produce an ignition probability map. Based on the ignition probability map, thousands of potential ignition points located in areas of anticipated high risk will be generated. These ignitions will be further used as inputs on MTT simulations, running FConstMTT as a command line-based executable. FConstMTT calculations will be conducted on parallel using different number of ignition points in each simulation. The current deployment of the AEGIS platform consists of a number of virtual computing machines resided on premises and a scalable Cloud computing environment based on the Windows Azure infrastructure. This parallel computing environment ensures high processing power and high data