



CIELAB color space values of burnt granitic soils as a tool for estimating fire severity

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Soil colour is often used to characterize and differentiate soils, as the colour is one of the most distinctive morphological features of a soil. As the colour of soil is strongly influenced by the type and amount of organic matter and Fe content, both of which are fire-sensitive components, colour and burn severity should be correlated. In this work we explore the usefulness of the CIELAB color space parameters of burnt soils as a tool for estimating fire severity. For this purpose, samples of forest soils developed on granite were collected from three different sites of NW Spain and subjected to controlled thermal shocks at microcosm scale. The thermal shock was performed in topsoil by the action of infrared lamps, which allowed reproducing similar temperatures to those reached in low, moderate and high severity fires. The maximum temperature and the degree hours (DH) reached during the heating were measured as indicators of fire severity. Three different methods of measuring the colour of the burnt samples were compared in order to determine which was best for the purpose of the study. Changes in the colour of the soil and in the contents of organic matter and iron compounds were also analysed. The results obtained in the present study for granitic soils show that the values of the CIELAB parameters defining the colour of the surface of burnt granitic forest soils increased with the temperature and DH reached. Although the amount of organic matter was significantly correlated with all colour parameters and with temperature and DH reached, the Fe compounds were not significantly correlated with either CIELAB parameters, temperature or DH reached. Statistical analysis of data allowed formulate simple expressions for estimating temperature and DH reached from CIELAB and organic matter values.