DSR spatial – temporal modelling using ANN's and geostastical methodologies.

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Abstract

The Daily Severity Rating (DSR) is a component of the Fire Weather Index System, providing a measure of the difficulty of control in terms of the fire danger index. DSR is determined based on daily weather observations of temperature, wind speed, 24 hour rainfall and relative humidity.

Historical relationships between weather and the DSR were analyzed using artificial neural networks (ANN's) for 2 fire seasons (2003 and 2004) in Portugal. ANN's are non-linear mathematical structures capable of arbitrarily represent complex and non-linear processes that relate inputs and outputs of any system, essentially used in pattern classification and function approximation.

The objective of this study was to develop and implement ANN temporal models to predict DSR values for a given day based on the weather of the previous one. Good correlations between predicted and observed DSR values reveal a quite good prediction local model. Performance and robustness could be enhanced using longer data series.

Afterwards, local predicted DSR values were interpolated, assessing the probability of occurrence of extreme values for Portugal, using geostatistical methodologies of stochastic simulation.

Keywords: Daily Severity Rating (DSR), ANN models, Geostatistics, Stochastic Simulation.