



# 1 Direct Sequential Simulation approaches for mapping the meteorological risk of fire over Portugal.

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Daily Severity Rating (DSR) is the final index of the Canadian Fire Weather Index System (CFWIS). This system uses daily weather observations or forecasts to calculate moisture of several fuel types and size classes, and combines them into indices of fire danger related to fire potential rate of spread, heat release, and fireline intensity.

DSR depends only on daily measurements of air temperature (°C), relative humidity (%), 10-m open wind speed (Km/h) and 24-h accumulated precipitation (mm) is a numeric rating of the difficulty of controlling fire and it is based on the Fire Weather Index (FWI) but reflects more accurately the expected efforts required for fire suppression.

The focus of the present work is to evaluate the spatial distribution of DSR index over Portugal through Direct Sequential Simulation models, in order to assess the associated spatial uncertainty. Local pdfs and spatial uncertainty was evaluated by a set of one hundred equi-probable simulated images of the DSR values.

Direct Sequential Simulation models were applied in two different approaches:

- first the DSR values were computed and then simulated for a regular grid of stations covering the entire country.
- Afterwards we had simulated first the meteorological variables and then computed the DSR.

Results are presented and discussed for the Portuguese Fire Seasons of the period 2000-2005.

Meteorological data were obtained from 15 meteorological stations representing the counties where the meteorological risk of fire and fire occurrence was being studied.

Keywords: Meteorological Risk of Fire, Direct Sequential Simulation Models, Spatial Uncertainty