



The estimation of forest fire risk in boreal forests

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Since summer 1996 the forest fire index calculation in Finland has been based on surface moisture estimation. The calculation is done on a 10 km*10 km grid. Air temperature, air humidity, wind speed, solar radiation and precipitation measurements made at observing stations are interpolated onto the grid with an objective interpolation method known as 'kriging'. Potential evaporation is calculated for each grid-square based on the interpolated meteorological data using the Penman-Monteith equation. In the estimation of the spatial and temporal variation of rainfall also information obtained from weather radar network is utilized. The moisture of a 60 mm thick surface layer is estimated using potential evaporation and precipitation data and, finally, the surface moisture is scaled to forest fire index values (1-6) which are distributed to the fire authorities through the Internet.

The wild fire risk in the boreal forests has typically two peaks: first during the early spring due to a large amount of previous summer's dried plant debris on ground and no green vegetation and the second peak is during late summer when the soil has dried also from deep layers. This temporal variation can be estimated using temperature sum and rainfall deficit. There are a few times in a summer extreme high risk cases when the wind speed and the air temperature are high and the air moisture low. There is a special parameterization developed for the prediction of these cases