Portuguese index

Description

The Portuguese index was developed by the Portuguese meteorological and geophysical national institute based on the Nesterov index (Instituto Nacional de Meteorologia e Geofisica 1988, Gonçalves & Lourenço 1990, Camia & Bovio 2000), and requires air temperature, dew point temperature and wind speed at noon, as well as daily rainfall as input data.

The Portuguese index is composed of three numerical indicators (Camia & Bovio 2000): (1) a daily ignition index; (2) a cumulative index consisting of the sum of the ignition index previous days' values (from the beginning of the fire season), and corrected by a factor depending on the previous day's rainfall; and (3) the final fire danger index which consists of the combination of (1) and (2), and is corrected for wind speed.

Formula

The ignition index IG on day t is calculated as follows:

$$IG_t = T_{12_t} \cdot (T_{12_t} - T_{dew_{12_t}})$$

where T_{12} is air temperature [°C] and $T_{dew_{12}}$ dew point temperature [Â°C] at noon.

The cumulative index B on day $t-1$ is calculated as follows:

$$B_{t-1} = p_{t-1} \sum_{i=1}^{t-1} IG_i$$

where p is the correction factor for the previous day's rainfall P, which is determined according to the following table:

p	Rainfall [mm]
1	$0 < R \leq 1$
0.8	$1 < R \leq 2$
0.6	$2 < R \leq 3$
0.4	$3 < R \leq 4$
0.2	$4 < R \leq 10$
0.1	$R > 10$

The fire danger index Ifa on day t is finally calculated as follows:

$$Ifa_t = IG_t + B_{t-1}$$

Note: the original publication is still not gathered. According to the Megafires project following conversion should be performed before calculating
Ifa:

IG	New value
$IG < 151$	1
$151 \leq IG < 301$	2
$301 \leq IG < 451$	3
$451 \leq IG < 601$	4
$601 \leq IG < 751$	5
$IG >= 751$	6

B	New value
$B \leq 301$	1
$301 \leq B < 1001$	2
$1001 \leq B < 2001$	3
$2001 \leq B < 4001$	4
$4001 \leq B < 6001$	5
$6001 \leq B < 8001$	6
$8001 \leq B < 10001$	7
$10001 \leq B < 12001$	8
$12001 \leq B < 15001$	9
$15001 \leq B < 18001$	10
$18001 \leq B < 21001$	11
$21001 \leq B < 24001$	12
$24001 \leq B < 27001$	13
$27001 \leq B < 31001$	14
$31001 \leq B < 35001$	15
$35001 \leq B < 39001$	16
$39001 \leq B < 43001$	17
$43001 \leq B < 47001$	18
$47001 \leq B < 51001$	19
$B >= 51001$	20

Ifa has to be corrected for wind speed V as follows:

Wind speed [km/h]	Correction to *Ifa*
$V \leq 10$	none
$10 < V \leq 15$	+1
$15 < V \leq 20$	+2
$20 < V \leq 30$	+3
$30 < V \leq 40$	+4

Wind speed [km/h]	Correction to *Ifa*
V > 40	+5

Index interpretation

according to megafires project. Still not clear if also proposed in the original publication

Corrected Ifa	Danger class
0-1	I None
2-4	II Low
5-8	III Moderate
9-12	IV High
13-17	V Severe
>18	VI Extreme

References

Original publication:
Instituto Nacional de Meteorologia e Geofisica 1988
Gonçalves & Lourenço 1990
Other publication:
Viegas et al. 1999
Camia & Bovio 2000
Fujioka et al. 2008
