

Baumgartner index

Description

The Baumgartner index is a fire danger index developed by [Baumgartner et al. \(1967\)](#) in Bavaria (Germany), based on the concept that fire danger is mainly conditioned by fuel dryness which, in turn, depends on evapotranspiration. [Baumgartner et al. \(1967\)](#) thus designed an index consisting of the difference between [potential evapotranspiration](#) - after the [Penman \(1948\)](#) formulation - and precipitation.

The calculation of the Baumgartner index requires daily precipitation [mm] and the [potential evapotranspiration](#) after [Penman \(1948\)](#) as input variables.

Although it was designed there, [Langholz & Schmidtmayer \(1993\)](#) found the Baumgartner index relatively unsuitable for predicting fire danger in Bavaria, above all in spring when dead litter flammability depends less on the precipitation of the last five days than on current or short-term drought conditions (cf. section "Formula").

Formula

The Baumgartner index BI is calculated as follows ([Baumgartner et al. 1967](#)):

$$BI_t = \sum_{i=1}^5 (PET_{t-i} - P_{t-i})$$

where PET is the sum of the [potential evapotranspiration](#) [mm] according to [Penman \(1948\)](#) and P the sum of precipitation [mm] during the five days preceding the day for which the index has to be calculated.

The Baumgartner index is supposed to be calculated on a daily basis. The data for calculating the potential evapotranspiration have to be recorded at 2 pm.

The calculation of the Baumgartner index should to be started after snowmelt in late winter/spring. No particular starting value is stipulated.

Interpretation

[Baumgartner et al. \(1967\)](#) proposed a fire danger classification according to the output values of their index:

Month	Fire danger class				
	low	slight	moderate	high	very high
March	< 5	5 - 3	3 - 9	9 - 15	> 15
April	< 3	3 - 8	8 - 16	16 - 27	> 27
May	< 3	3 - 16	16 - 25	25 - 35	> 35
June	< 12	12 - 24	24 - 32	32 - 41	> 41
July	< 12	12 - 24	24 - 31	31 - 40	> 40
August	< 8	8 - 20	20 - 28	28 - 37	> 37

September Month	< 6	6 - 18	18 - 26	26 - 35	> 35
	low	slight	moderate	high	very high

Unfortunately, no fire danger classification was provided for winter months.

References

Original publication:

[Baumgartner et al. \(1967\)](#)

Other publication:

[Penman \(1948\)](#)

The original document is available at <http://wiki.fire.wsl.ch/tiki-index.php?page=Baumgartner+index>