

Desbordes Rainfall

The Desbordes Rainfall refers to the double-triangle hyetograph that was proposed by Prof. Michel Desbordes (Université de Montpellier, France) in the late 1970s. One key principle behind the approach is that the rainfall hyetograph is not trying to replicate observed rainfall patterns, instead its characteristics are derived from a sensitivity analysis of the response of a simple linear reservoir model. The shape of the double-triangle hyetograph aims to reduce the number of sensitive parameters to a minimum. This design rainfall method is the most commonly used in France for hydrological modelling of urban catchments.

The rainfall intensities can be specified using calculated Intensity-Duration-Frequency (IDF) curves for the area of interest. In France the most common way of using IDF data is via the so-called Montana coefficients. These 2 coefficients (a and b) are used in the Montana formula that gives the maximum mean intensity for an event of a given duration and return period.

$$I = a * t^{-b}$$

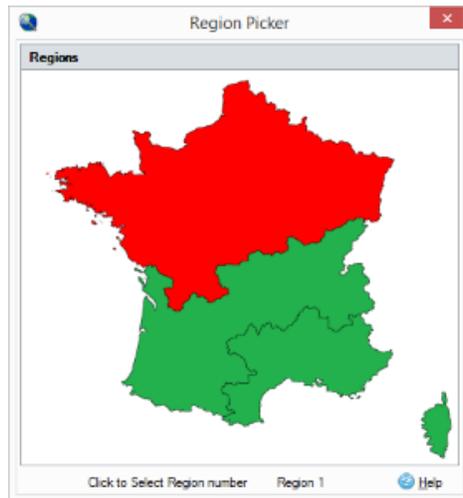
In practice a table of coefficients a and b can be obtained from [Meteo France](#) for a number of return periods (usually up to 100 years at least), from the meteorological station nearest to a study area. However if this is not available, the common approach is to use the Montana coefficients given in a guidance document from 1977 (the "Instruction Technique 77") where the coefficients are given for 4 return periods (up to 10 years) on the basis of 3 different zones covering mainland France and Corsica. This is normally not the favoured approach because it is widely acknowledged that better data is available nowadays (much longer rainfall time series are now used to derive the Montana coefficients). Also the subdivision of France in 3 zones is very crude as it has been shown that there are in practice large variations in rainfall intensities within any one of the 3 zones. However this approach can still be useful for a preliminary investigation.

Return Period (years)

The software contains the Montana coefficient values for the 4 return periods specified in the original guidance document (Instruction Technique 77) - 1, 2, 5 and 10 years. However 'Custom' can be selected to enter your own return period if you wish to enter your own coefficient values for another return period.

Region

Select which area of France the site is located in (according to the sub-division shown in the Instruction Technique 77). The Map button allows this to be selected graphically by hovering over the region required and left clicking.



French Region Picker

Coefficients a and b

There are two sets of a and b coefficients, one for the shorter intense period triangle and the other to describe the overall duration triangle. These are automatically assigned for the built-in 1, 2, 5 and 10 year return periods (as given in the Instruction Technique 77), for other return periods they need to be entered manually. However any value may be over typed if a known value(s) has been supplied, most likely from [Meteo France](#).

The calm period values for a and b default to values approximately equivalent to a 0.5 year return period.

Note the convention for the sign of b : b is considered a positive value.



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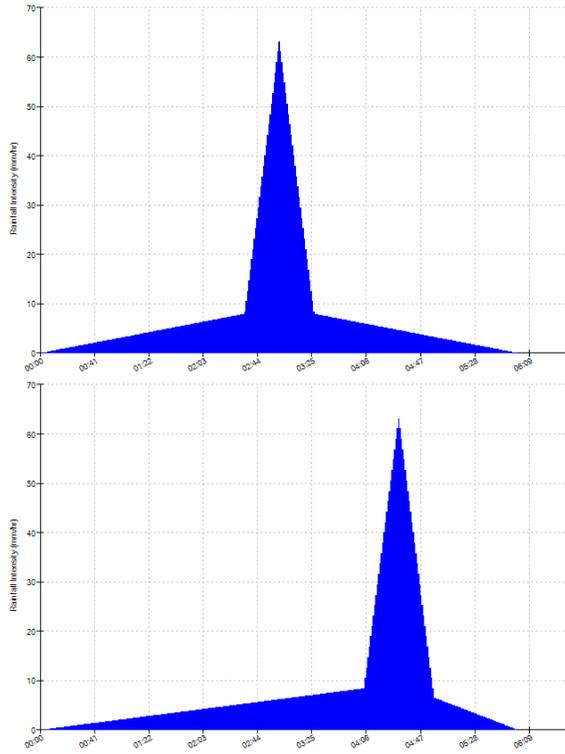
Workflow - What's next...?



Connect Inflows to your **Stormwater Control**, specify **Inlets** or **Outlets** or connect to another Stormwater Control or **Junction**.

Position of Peak

This parameter describes the position of the peak of the intense period triangle within the whole event duration. By default a value of 0.5 is selected which means that the peak is in the middle of the storm (symmetrical hyetograph). The specified value applies to all the selected durations.



Two example rainfall hyetographs. This first for a position of peak value of 0.5 the second at 0.75.

Storm Durations

A set of Storm Durations and run times must be specified for the analysis to run back to back. All duration values can be edited, and new rows can be added for additional durations.