

## Dry season modeling in Cojedes State, Venezuela by drought analysis of Tirgua river flows

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**Abstract.** In the last years Venezuela has been subject to extremely dry periods during the winter season, causing a drastic reduction of minimum flows of rivers. The year 2003 was characterized by the severe drought period in Cojedes State making to believe at that time that this phenomenon could have caused the drastic reduction of the mean flow of Tirgua River. As the river is the mean source of water supply of the State, especially, for municipalities San Carlos, Tinaco and Falcón, it is very important to study the behavior of the river flows during the dry season of the year. So this research deals with the analysis of duration and number of dry periods of Tirgua River. The study is based on the daily mean flows of the river at Paso Viboral gaging station for the period 1963 - 1993. The statistical analysis of the flow records shows for the daily minimum discharge a very high variations coefficient of 90 % (mean = 13 m<sup>3</sup>/s; and standard deviation = 12 m<sup>3</sup>/s). The chronologic flow series has a tendency to the occurrence of dry periods. The Wisser model was used to find the behavior of dry periods for different durations (from 1 to 60 days). The minimum flow is related with the duration (D) and the interval of recurrence (T<sub>r</sub>) as  $Q_{\min} = 5,053.D^{0,105}.T_r^{-0,925}$ , while the number of dry periods (n<sub>d</sub>) follows a pattern given by:  $n_d = 411,322.e^{-0,568.d}$  as a function of duration (d). Apparently the drought of 2003 was only a result of the stochastic behavior of the flows. Nevertheless it could be advisable to study their periodicity as well.

**Key words:** Extreme droughts, drought analysis, minimum flows, dry periods.

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