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**STATISTICAL ANALYSIS FOR MODELLING
THE HYDROLOGICAL RISKS IN NORTHERN MEXICO**

Alfonso Gutiérrez, Thierry Lebel, Luc Descroix

Laboratoire d'Etude des Transferts en Hydrologie et Environnement, LTHE, UMR 5564
BP 53, 38041 Grenoble Cedex 9, France
Tel. +33 4.76.82.52.82 Fax. +33 4.76.82.52.86
E-mail : alfonso.gutierrez@inpg.fr

Abstract

Northern Mexico is characterized both by the frequent occurrence of extreme rainfall, causing floods and severe damages to growing and by long periods of drought. It is therefore crucial, from a risk analysis point of view, to obtain a regional view of the probability of such events. This paper presents a stochastic model of rainfall distribution and its regionalisation, taking into account the seasonal cycle. The analytical formulation of the model and some of its main properties are recalled. The rainfall regime is described by two parameters: the average rain depth per event and the mean number of events during a period of given length T . This latter parameter is additive. Both parameters may be considered as non-stationary parameters, allowing a description of the evolution of the rainfall regime along the year. The method is applied to 46 rain stations of the hydrological region 10, over a mean period of 25 years. The regionalisation itself is carried out in a geostatistical framework, focusing on three time scales: annual, monthly and daily. The results obtained by the model are compared to those obtained by a direct

fitting of a Gumbel distribution to series of extreme values. The scale parameter β is used as a measure of the hydrological risk. This provides an integrated approach for the mapping of the hydrological risk over both gauged and ungauged basins.