

RISK MANAGEMENT OF NATURAL DISASTERS IN MEXICO: AN APPLICATION OF MULTIFRACTAL MEASURES AND STOCHASTIC CONTROL

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Mexico is a country which has to deal with several natural disaster risks: earthquakes, droughts, volcanic eruptions, floods, slides, wild fires, extreme temperatures, etc. In order to reduce the country's vulnerability to the impact of these natural disasters and to support rapid recovery when they occur, the government established in 1996 Mexico's Fund for Natural Disasters (FONDEN).

FONDEN's rules of operation establish that in case of high probability of natural disaster or imminent danger, the local governments can declare a situation of emergency to get resources from the FONDEN faster, so that they can take measures in order to attenuate the effects of the possible disaster. In this case, it becomes desirable to link the output of a forecasting or warning model with a strategy to manage the crises.

If a natural disaster occurs, the FONDEN can provide resources to confront the situation. Since this is a last-resource fund and its use is subject to budget restrictions, nowadays the procedures to get FONDEN's resources last at least 4 months.

We strongly believe that a risk transfer strategy joint with an efficient budget planning could help improve the time response in case of a natural disaster. Our aim is the development of a dynamic strategy to optimise the management of the FONDEN by controlling the retention level. The optimality is in the sense of minimizing the ruin probability.

In recent years, new uncertainty concepts in meteorology based on multifractal fields are being applied to the development of techniques to calculate marginal and conditional probabilities of an extreme rainfall event in a determined zone. As initial point to the development of the model, a multifractal model for extreme rainfall events will be used as part of the input for the stochastic control model. A theme for further research is to link more warnings systems to the model.