

Application of pattern recognition algorithm in the seismic belts of Indian convergent plate margin – CN algorithm

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Abstract. The earthquake catalogue from 1964 to August 1991 is used to identify the times of increased probabilities (TIPs) of the earthquake mainshocks of magnitudes greater than or equal to 6.4 and are associated with the Indian convergent plate margins, in retrospect. In Pakistan and Indo-Burma regions, the analysis was repeated for magnitude threshold 6.2 and 7.0 respectively. All the earthquakes (except one in the Hindukush region and one in Indo-Burmese region) in Pakistan, Hindukush-Pamir, Himalaya and Indo-Burmese regions were preceded by the special activation and hence were predicted.

Approximately $23 \pm 10\%$ of the total time (1970 to August 1991) is occupied by the TIPs in all the regions. The reasons for failure to predict the two earthquakes in these regions are discussed.

Our analysis gives a better picture of the regionalization and the size of the space-time volume for the preparation of an earthquake. The high success ratio of the algorithm proves that it can be applied in this territory for further prediction in the real time, without any significant changes in its parameters.

Keywords. Intermediate term prediction; CN algorithm; times of increased probability; regionalization.

1. Introduction

Considering the self similar nature of the earthquakes in different tectonic environments, an attempt to develop an algorithm, based on the pattern recognition technique, was introduced by Allen *et al* (1984) and Keilis-Borok and Rotwain (1990), and the so developed algorithm was named as CN (for California Nevada, as for the first time it was successfully applied there). Later on it was successfully applied in the different seismic belts of the world (Keilis-Borok and Rotwain 1990 and Gabriellov *et al* 1986).

In this study we have applied this algorithm in the seismic belts associated with the Indian convergent plate margins (figure 1). The almost NNE (N15°–20°E) movement of the Indian plate and its convergence with the Eurasian plate, make the earthquakes to occur along its margins in Pakistan, Hindukush-Pamir, Himalaya and Indo-Burmese mountain chains. Here, our purpose is to investigate the applicability of CN algorithm to the retrospective prediction of strong mainshocks (common maximum magnitude greater than or equal to 6.4) in the regions, mentioned above, which