Evaluating the seismicity parameters of Tehran, Iran

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The objective of this paper is to evaluate the seismicity parameters of Tehran. These parameters are achieved using the Gutenberg–Richter method, cumulative distribution functions, and the Kjölo–Sellevoll approach. First, a catalogue of earthquakes that have occurred within a radius of 200 km of Tehran is collected and processed. Aftershocks and foreshocks are ignored in the earthquake catalogue, and the main seismic events are considered in evaluating the data. In this approach the variable windows in time and location domains are employed, and the earthquakes are supposed to follow Poisson’s formulation. Subsequently, the seismicity coefficients for Gutenberg–Richter, cumulative distribution functions, and Kjölo–Sellevoll methods are calculated and the magnitude–period graphs are constructed. Comparative analysis of the results shows the best accuracy for the Kjölo–Sellevoll method, with the Gutenberg–Richter method providing the least precise results.

I. INTRODUCTION

Iran is one of the most seismically active countries situated on the Alp-Himalayas belt. To date, many devastations and heavy casualties have been evidenced in this area. Fig. 1 shows a seismicity map of Iran during recent years.

Tehran, the capital of Iran, with a large population of 10 million people is considered to be a political and economic centre. The occurrence of an earthquake in such a densely populated city, with its significant situation, will result in severe consequences. The occurrence of several historical