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Detection of Change Points in Earthquakes Data: A Bayesian Approach

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Abstract : In this study, we applied the Bayesian hierarchical model to detect single and multiple change points for daily earthquake body wave magnitude. The change point analysis is used in both backward (off-line) and forward (on-line) statistical research. In this study, it is used with the backward approach. Different types of change parameters are considered (mean, variance or both). The posterior model and the conditional distributions for single and multiple change points are derived and implemented using BUGS software. The model is applicable for any set of data. The sensitivity of the model is tested using different prior and likelihood functions. Using Mb data, we concluded that during January 2002 and December 2003, three changes occurred in the mean magnitude of Mb in Kuwait and its vicinity.

Keywords : multiple change points, Markov Chain Monte Carlo, earthquake magnitude, hierarchical Bayesian mode
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