Fractal properties of the distributions of earthquake hypocenters and magnitude

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We examine the fractal properties of the densely distributing earthquake clusters beneath the Kanto district in Japan. The fractal dimensions of hypocenters, D, were obtained using a box counting method, and b-value of the Gutenberg and Richter relation were calculated by maximum likelihood. Though we do not observe a clear relationship on the whole, some clusters in a limited depth range show a negative correlation between D and b-value. Further, some large clusters show both the negative and positive correlations between D and b-value dependent on the time period during recent 16.6 years. We argue the temporal and spatial change of D, b-value and their relationship in terms of the loading stress and criticality.