A model of seismogenic layer inferred from the number-magnitude distribution of earthquakes

harumi aoki

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The number-magnitude distribution of earthquakes suggests an irregular structure of the crust. The model presented here supposes a layer made up of broken blocks in the crust, where size of earthquake depends on block size. In order to simulate such a structure, the original layer is divided into two blocks with arbitrary ratio. Next, each block is similarly divided into two. The k-th division makes \(2^k\) blocks. We call it k-th division of basic process. The number-size distribution of basic process is obtained with the use of random function. At a point in time, however, the order of division is different from place to place. Such a block distribution is interpreted as a weighted sum of basic processes. It is found that the equal weight gives rise to a b value close to 1 and lower weight in higher order of division, less than 1, respectively. The constancy of b value is held for a wide range of magnitude.

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