

A sandpile experiment --- Self-organized criticality and characteristic earthquake

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We have made a series of sandpile experiments. We used three disks with diameters of 4, 5 and 8 cm on which sand was slowly dropped. Avalanches occurred with various magnitudes. We found that among the various factors which affects the magnitude of avalanche, the most important factor is the size of the disk. When we use a small disk, the magnitude-frequency relation obeys the Gutenberg-Richter law (a power law) and the system can be regarded as in self-organized criticality. On the contrary, when

we use a large disk, significantly large and periodic avalanches are observed to occur. The magnitude-frequency relation no longer exhibits the power law. Elucidating the mechanism of this behavior is very important in considering the differences between SOC and characteristic earthquake.