

An analog tool of two-dimensional spring-block model for education and outreach

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The fact that the occurrence of earthquakes strictly obeys the famous Gutenberg-Richter's law is quite essential for earthquake experts, however few people could understand the details of these phenomena. The misunderstanding and confused awe for disastrous disasters seems to be brought from these backgrounds. In this regard, we developed some educational tools for understanding the G-R law; Go-game model(Ohtsuka,1971), sand-pile model(Bak et.al,1989). Kato(2007) described his one-dimensional Burridge-knopoff model as an educational tool. We introduced here another two dimensional B-K model extended from Kato's model. The model consists of thick iron plates (60x60x12mm) and color rubber bands. Each iron plate has four brass hocks on its sides, and is connected to their four nearest neighbors with the rubber bands. The system is driven by a wooden square rim connecting with rubber bands and surrounding whole system. The exercises are carried out on our class room floor, the students watch and count the slips of each or whole blocks (occurrence of earthquakes), while the system is driving slowly to one direction(a mimic of plate motion). Our preliminary results show clear consistency with the G-R law. The students fully enjoy the counting exercises and can be strongly inspired with the fine results. Through these exercises and analysis, they study the interesting character of the G-R law and occurrence of earthquakes. The details of this model and analysis will be presented at the conference.

Keywords: spring-block, Gutenberg-Richter's law, earthquake, education, high school