Synchronization in Self-organized Criticality

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The modern representation identifies earthquakes and many other complicated natural processes/systems, demonstrating 1/f noise properties as self-organized criticality (Bak, P., et al., 1987). That, in principle, excludes the possibility to predict the behavior of such a system and catastrophic event. The introduction of synchronization phenomenon in a sub cluster of systems with indications of self-organized criticality (Lursmanashvili O., et al., 2010) may remove this restriction. The simple and well-known in electronics object – synchronized relaxator, corresponds to very helpful demonstration experiment and model for this sub cluster events. It may be applied to earthquakes and to the variety of different natural phenomena study. The presence of the sensitivity of criticality elements to external synchronizing factor, should be discovered and demonstrated in each particular case by observations and experiments.

1. Bak, P., Tang, C. & Wiesenfeld, K. **Self-organized criticality: An explanation of 1/f noise**, Phys. Rev. Lett.,59, 381-384, 1987.
2. Lursmanashvili O., Paatashvili T., Gheonjian L., 2010. **Detecting quasi-harmonic factors synchronizing relaxation processes: application to seismology.** In "Synchronization and Triggering: from Fracture to Earthquake Processes: Laboratory, Field Analysis and Theories" Ed. By V. de Rubeis, Z. Czechowski, R. Teisseyre. Springer, 2010, pp. 305-322.