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Soft computing analysis of the possible correlation between temporal and energy release patterns in seismic activity

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This paper is a preliminary investigation of the possible correlation of temporal and energy release patterns of seismic activity involving the preparation processes of consecutive sizeable seismic events [1,2]. The background idea is that during periods of low-level seismic activity, stress processes in the crust accumulate energy at the seismogenic area whilst larger seismic events act as a decongesting mechanism releasing considerable energy [3,4].
A dynamic algorithm is being developed aiming to identify and cluster pre- and post- seismic events to the main earthquake following on research carried out by Zubkov [5] and Dobrovolsky [6,7]. This clustering technique along with energy release equations dependent on Richter's scale [8,9] allow for an estimate to be drawn regarding the amount of the energy being released by the seismic sequence.
The above approach is being implemented as a monitoring tool to investigate the behaviour of the underlying energy management system by introducing this information to various neural [10,11] and soft computing models [1,12,13,14]. The incorporation of intelligent systems aims towards the detection and simulation of the possible relationship between energy release patterns and time-intervals among consecutive sizeable earthquakes [1,15].
Anticipated successful training of the imported intelligent systems may result in a real-time, on-line processing methodology [1,16] capable to dynamically approximate the time-interval between the latest and the next forthcoming sizeable seismic event by monitoring the energy release process in a specific seismogenic area.

Indexing terms: pattern recognition, long-term earthquake precursors, neural networks, soft computing, earthquake occurrence intervals

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