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The stochastic resonance model of seismic activity in the plate boundary

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The mechanical activity of the plate boundary rocks are characterized by sporadic distribution of asperity and slip zones. The size of the asperity is recently estimated to widely change from finding of various sized repeating earthquakes along on plate boundary. Furthermore, the repeating activity of small asperities is roughly periodic rather than non plate boundary seismic faults. Besides, it is very important features that regions of small asperities correspond to large asperities. These facts strongly suggest that the large seismic events seperate events of small seismicity. In addition, these spike like signals are strongly dependent with each other inspite of short relaxation times after seismic event.Considering that spike signals are generated mainly by accumulation of deformation of the plate boundary zone, the coseismic and interseismic spike signals are connected by background noise changing with water content and heterogeneity of rocks and their damages. Moreover, the spike generation with various intensities should follow the Langevin type stochastic equation having noise term of small spikes. Therefore, two activity states of seismicity can be considered as follow; one is the event spike of the whole asperity and another is the random activity of small asperities. The large whole asperity event spike should be considered to be a result ofstochastic resonance of randomly activated small asperities. This model for connective slip of small asperities can be checked by the noise level change before large spike activities.

Keywords: large earthquake, small earthquake, asperity, stochastic resonance, multiperiodicity