



Can Observed Seismo-Electromagnetic Phenomena Be Explained By Known Mechano-Electromagnetic Mechanisms?

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Seismo-electromagnetism (SEM), in general, and lithospheric-atmospheric-ionospheric coupling in particular, continue to attract attention as possible earthquake precursors. Do these phenomena in fact exist?

Currently there are no models which can explain a variety of electromagnetic observations before and after seismic events ranging from atmospheric light to electromagnetic field to ionosphere disturbances. Most existing models are qualitative, and quantitative estimates are usually superficial.

Here we present the results of calculation of electromagnetic signals generated by modeled mechanical disturbances in the earth's crust. The major known SEM phenomena, namely, tectonomagnetic variations, electrotelluric anomalies, geomagnetic variations in the ultra-low frequency range and electromagnetic emission in the radio frequency range, have been considered. We discuss the conditions under which electro-kinetic, piezo-magnetic and piezo-electric effects could be responsible for SEM. A comparison of estimated values of SEMs with reported field measurements leads to the conclusion that, although these mechanisms may explain some of the observations, the sources of most anomalous SEM phenomena should be relatively close to the detector. In other words, the source of the signal is local, although the source of the mechanical disturbance which activates it, e.g. the epicenter of an earthquake, may be far away.