Earthquake prediction: current status of seismo-electromagnetics

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Systematic research on EQ pediction started in early 1960's. Optimism prevailed in the 1970's, due to some successes. However, now the community at large is hopelessly pessimistic. Short-term EQ prediction definitely needs reliable precursors. During the last couple of decades, many kinds of non-seismological precursors have been found. Hydro-geochemical, water level, radon emission and electromagnetic phenomena are notable examples. We review here the present status of the seismo-EM studies which have been started in countries, including Greece, Russia (CIS), France, Japan, Taiwan, Mexico, India, Turkey, and Indonesia. Despite the substantial progress, however, this type of research is still far from general recognition. The conventional seismologists tend to be either disinterested or skeptical about non-seismological precursors. But, some of non-seismic precursors may be orders of magnitude more sensitive than conventional ones. They are governed by high non-linearity of physics involved and strong heterogeneity of the earth structure. Another reason for not appealing to seismologists may be that many, if not all, non-seismic precursors may merely be by-products of EQ preparation process and play no causative roles in EQ generation while some EM phenomena may even trigger earthquakes. So much for complaint, we must recognize serious defects in our research. 1) We still lack unquestionably well documented case studies. 2) Fundamental problems are unresolved. True mechansim of signal generation and what causes LAI-coupling at pre-seismic stage, and the transmission of high frequency signals in conductive earth, to name a few.