On possible electromagnetic effects on abnormal animal behaviors before an earthquake

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The former statistical properties summarized by Rikitake (1998) on unusual animal behaviors before an earthquake (EQ) have first been presented by using two parameters (epicentral distance (D) of an anomaly and its precursor (or lead) time (T)). Three plots are utilzed to characterize the unusual animal behaviors; (i) EQ magnitude (M) versus D, (ii) log T versus M, and (iii) occurrence histogram of log T. These plots are compared with the corresponding plots for different seismo-electromagnetic effects (radio emissions in different frequency ranges, seismo-atmospheric and –ionospheric perturbations) extensively obtained during the last 15-20 years. As the results of comparisons in terms of three plots, it is likely that lower frequency (ULF (ultra-low-frequency, f < 1Hz) and ELF (extremely-low-frequency, f < a few hundreds Hz)) electromagnetic emissions exhibit a very similar temporal evolution with that of abnormal animal behaviors. It is also suggested that a quantity of field intensity multiplied by the persistent time (or duration) of noise would play the primary role in abnormal animal behaviors before an EQ.