

On high-frequency EM data before and after the occurrence of the 1999 Izmit earthquake

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We have examined electric and magnetic field data obtained at four sites just over the rupture zone of the Izmit earthquake (Mw7.4), only to find no significant anomalies before the earthquake. The sampling interval was 1/24 second and hence examination was made for rather low frequencies. In addition to this, a higher sampling dataset was also obtained, although recording was not continuous. In fact, the sampling interval was 1/320 second and recording was made every 10 minutes for 8 seconds. Nonetheless such a dataset is still extremely important in the following aspects. (1) The possibility of EM signals before the earthquake occurrence can be examined for frequencies higher than previously examined. (2) A possible change in resistivity changes in the seismogenic zone is examined with time-dependent apparent resistivity and phase for high frequencies. (3) EM signals due to the seismic dynamo effect might be utilized for precise determination of hypocenters of small foreshocks.

Our preliminary studies show that no marked changes in EM fields for the frequency range 10 ࣈ 40 Hz are not seen before the occurrence of the Izmit earthquake, as was the case for lower frequencies. As for EM signals of seismic dynamo origin, some portions included signals, but they were not useful enough for hypocenter determination. Instead, however, we found more significant signals in the 24-Hz data and the hypocenter of foreshock immediately before the mainshock seems to be determined together with seismic data at one station located near the epicenter. We are now examining the apparent resistivity and phase for the frequency range 10 ࣈ 40 Hz.