

Precursory study of electromagnetic wave addressed to the earthquake prediction study in VLF band.

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There are many reports electromagnetic waves preceding earthquakes have existed since the 1980s. The late Professor Toshi Asada and his colleagues focused on the VLF band and developed devices and made observations at the Tokai University in the 1990s. As a result, in the apparent arrival direction analysis, the electromagnetic waves, which comes from the epicenter direction were observed. After that, the observation was interrupted, but we resumed research from FY 2014. The feature of the present apparatus is that not only the apparent arrival direction analysis but also the wave source determination can be performed using the time difference of arrival (TDOA) of electromagnetic waves. In the wave source determination using TDOA, the arrival time of the electromagnetic wave was determined by using the autoregressive model and AIC. We observed electromagnetic waves coming from the epicentral region, two days before the earthquake, which occurred in the southern part of Nagano Prefecture on June 25, 2017 (M5.6). This earthquake was the largest one occurred in the vicinity of our observation network. However, it is highly likely that the electromagnetic environment is getting worse even in the VLF band over the past two decades, and by further reviewing the measurement environment, eliminating noise, and improving the program, more accurate wave source position determination will be possible.

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