

A study on DC/ULF electromagnetic waves possibly associated with large earthquakes observed at Nakatsugawa

Jun Izutsu[1]; Kenji Ohta[2]; Masashi Hayakawa[3]

[1] EWSN, Chubu Univ.; [2] Department of ED, Chubu Univ.; [3] Univ. Electro-Comms.

We have carried out the observation of ULF electromagnetic waves below 50Hz at Nakatsugawa in Japan (35.4N, 137.5E in Gifu Prefecture). Three magnetic components (B_x , B_y , B_z) are measured with induction coil antennas (the permalloy of 1.2m length with 100,000 turns of the copper wire) and are digitized with sampling frequency 100Hz. By using FFT analyze, the amplitude ratio and phase difference between the three magnetic components are estimated.

We report on the intensity and arrival direction of background noise observed at Nakatsugawa for earthquakes of Off Kii Peninsula, 2004 Niigata-ken Chuetsu Earthquake, and Sumatra-Andaman Earthquake. We observed possible precursory ULF emissions whose arrival direction are pointed toward the epicenter area with the error of ~ 10 degrees from these data signal analysis.

These earthquakes were shallow (10-30 km) and with large magnitudes, so that ULF waves can penetrate into the free space and propagate in the free sapce. We think our proposed method is useful for large and shallow earthquakes.

In Earth Watch Safety Net, Chubu University, we have observed electromagnetic waves in ULF/ELF range in order to monitor the earthquake activities around the Mid-Japan. We newly installed this ULF observation system at Shinojima and we will analyze multi-point observation data.

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