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Fundamental measurements of Radon concentration in a cave and the atmosphere for earthquake prediction

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An increase of the radon in underground water at Nishinomiya City[1] and an increase of the radon in atmosphere[2] at the southern part of Hyogo Prefecture earthquake in 1995 were reported. Moreover, in the case of Tohoku Region Pacific Coast Earthquake, the data of the exhaust air monitor in the radiation facility of Fukushima Medical College (Fukushima) has been reported that the peak duration was long, and the peak decreased rapidly before the earthquake[3].

We had started to measure radon concentration in the cave in Kurashiki, Okayama from the beginning of November, 2009, and started to measure radon concentration in the atmosphere from the end of May, 2011 in Choshi, Chiba. We used a Radon Monitor of SUN NUCLEAR Corporation, Model 1028 in the Kurashiki, and a Pylon Trace Environmental Level Radon Gas Detector in Choshi.

In the cave in Kurashiki, there is a tendency that radon concentration goes up after rainfall. Moreover, radon concentration becomes high in May and June, and in September and October as the seasonal variation. Earthquakes hardly occur in Okayama Prefecture. An earthquake(M=5.4) at 19:16 on November 21, 2011, northern Hiroshima (N34.9^o, E132.9^o, depth:12km, Distance: 90km) occurred. The radon concentration increased before the earthquake. However, there is rainfall before the day of radon increase. Then we could not get clear correlation between radon increase and the earthquake.

The radon concentration in the atmosphere of Choshi has a tendency of increase from September to winter. However, one year has not passed since the measurement start. Whether this increase means the usual seasonal variation or not is not clear. There are many aftershocks near Choshi. It is difficult to search for correlation between radon concentration variation and earthquakes.

Since the data of Kobe Pharmaceutical University and Fukushima Medical University are a prolonged measurement over ten years, it is necessary to continue radon concentration measurement for a long period in Kurashiki and Choshi.

References

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