

Ground-water radon concentration anomalies before 3 large earthquakes

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Time variations of ground-water radon concentration before M7.0 Izu-Oshima-Kinkai earthquake of Jan. 14, 1978 (Wakita et al., 1980), M7.2 Hyogoken Nanbu one of Jan. 17, 1995 (Igarashi et al., 1995), and M6.8 Chengkung one of Dec. 18, 2003 (Kuo et al., 2006) are investigated to find characteristic pre-seismic changes of the ground-water radon concentration.

1. Ground-water radon concentration at Nakaizu began to decrease from middle of October, 1977 of about 80 days before the M7.0 earthquake onset of Jan. 14, 1978. It became minimum and then rapidly attained to a maximum on Jan. 9, 1978 of 5 days before the earthquake onset.

2. Ground-water radon concentration at 17 m depth well in Nishinomiya, 30 km east of the epicenter began to increase from early November, 1994 of 78 days before the M7.2 earthquake onset of Jan. 17, 1995. It suddenly dropped to the minimum and attained rapidly to a maximum of 248 Bq/L on Jan. 8, 1995 of 9 days before the M 7.2 earthquake onset.

3. Ground-water radon concentration at Antung Hot Spring, Taiwan began to decrease from 28.9 Bq/L on Oct. 7, 2003 of 65 days before the M6.8 earthquake onset of Dec. 10, 2003. It decreased to the minimum of 12.2 Bq/L and then rapidly attained to a maximum on Nov. 20, 2003 of 20 days before the M 6.8 earthquake onset.

Ground-water radon concentrations before the 3 large earthquakes began to change about 2 months before each earthquake onset, decreased to each minimum, and rapidly attained to each maximum about an week to 20 days before each earthquake onset. We shall discuss an effect of upward tectonic stress on two layer ground-water structure model and its comparison with characteristic changes of the pre-seismic ground-water radon content.