Soil Gas Monitoring for Earthquake Precursory in Taiwan

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This study is focused to investigate the relation of variations of the soil-gas composition to earthquakes through a network of soil-gas radon stations in the vicinity of the geologic fault zone of Northeastern and Southwestern parts of Taiwan. Before selecting a monitoring site, deeper gas emanation was investigated by the soil-gas surveys which are followed by continuous monitoring of some selected sites with respect to tectonic activity to check the sensitivity of the sites. The stress-induced variations due to impending earthquakes in soil-gas are contaminated by meteorological changes and, hence assessment and quantification of these influences are a major prerequisite in the isolation of precursory signals. Based on the anomalous signatures from particular monitoring stations we are in a state to identify the area for impending earthquakes of magnitude morethan 5. In the northern part of Taiwan, a group of volcanoes is distributed in the area and these volcanoes are known as the Tatun volcano group (TVG). In order to study radon-thoron variation in volcanic areas, radon-thoron discriminators with LR films has been installed at four different places of TVG. The observations have shown potential precursory signals for some earthquakes within a distance of 60km from the monitoring stations during the observation period. From long-term data at the established monitoring stations, we can divide the studied area into two different tectonic zones. We proposed the tectonic based model for earthquake forecasting in Taiwan and tested it for some big earthquakes. For the earthquake prediction, the efficiency of an operational system depends not only upon its logical correctness but also upon the response time. Therefore, to overcome this problem real-time database had been developed.

Keywords: Soil-gas, Earthquake Precursors, Taiwan