

Content

Abstract	I
Content	II
List of Figures	III
List of Tables	IV
1. RESEARCH PRINCIPLES	1
1.1 Introduction	1
1.2 Research Principles	6
1.3 Origin and Behavior of the Gases Used	6
1.3.1 Radon	6
1.3.2 Helium	8
1.3.3 Carbon dioxide	8
1.3.4 Methane	8
1.3.5 Other gases	9
2. METHODOLOGY	10
2.1 The Monitoring Station	10
2.2 Sampling Procedure	11
2.3 Instrumentations	12
2.3.1 Radon Detector	12
2.3.2 Helium Detector	12
2.3.3 Other Gases Detector	13
3. RESULTS AND DISCUSSION	17
3.1 Definition of Anomalies	18
3.2 Results from Continues Monitoring	19
3.2.1 Results from Hsincheng Fault	19
3.2.2 Results from Hsinhua Fault	21
3.2.3 Results from Ilan Area	22
3.4 Conclusions	35
REFERENCES	36

List of Figures

Figure 1.1	Figure. 1.1 (a) 3D tectonic model of Taiwan (b) Active fault map of Taiwan alongwith monitoring station locations	5
Figure 2.1	Sketch scheme for continuous earthquake monitoring station	14
Figure 2.2	Sampling scheme used for collecting soil-gas samples	14
Figure 2.3	Radon detector RTM2100 (SARAD) used for soil-gas Radon (^{222}Rn) and (^{220}Rn) Thoron analysis	15
Figure 2.4	Helium leak detector ASM100HDS (ALCATEL) used for soil-gas helium (He^4)analysis	15
Figure 2.5	Micro Gas Chromatography CP4900 (VARIAN) used for soil-gas analysis	16
Figure 3.1	Pictures showing inside and outside view of Hsinchu Monitoring Station	23
Figure 3.2	Variations of radon, thoron, carbon-di-oxide, temperature and humidity at Hsinchu monitoring station and its correlation with earthquakes	25
Figure 3.3	Anomaly characterization at marked by red circle at (a) Hsinhua (b) Hsinchu monitoring stations	26
Figure 3.4	Online data base for monitoring stations	27
Figure 3.5	Pictures showing housing of the Hsinhua continuous monitoring station	28
Figure 3.6	Variations of radon, thoron, carbon-di-oxide, temperature and humidity at Hsinhua monitoring station and its correlation with earthquakes	30
Figure 3.7	Distribution of different profiles in (a) Ilan Plain (b) Nanao Fault, of Ilan area	31
Figure 3.8	Distribution of radon anomalies (blue dot) along profiles in (a) Ilan Plain (b)Nanao Fault, of Ilan area	32
Figure 3.9	Distribution of events recorded at monitoring station along Hsincheng fault in Hsinchu area	33
Figure 3.10	Distribution of events recorded at monitoring station along Hsinhua fault in Tainan area	34

List of Tables

Table.1	Statistical analysis of recorded data at both the monitoring stations	35
----------------	---	----