Precursory gas geochemical and gamma rays anomalies prior to the 2016 M6.4 Meinong earthquake, southern Taiwan

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Taiwan is tectonically situated in a terrain resulting from the oblique collision between the Philippine Sea plate and the continental margin of the Asiatic plate, with a continuous stress causing the density of earthquakes and faults. The continuous observations of soil radon for earthquake studies have been recorded and are compared with the data from gamma rays observations. Some anomalous high radon concentrations and gamma-ray counts at certain times can be identified. A significant increase of soil radon concentrations was observed at Gukeng (GK), Chunglun (CL) and Pingtung (PT) station, and an increase in gamma-ray counts at the Chung Cheng University (CCUG) was also observed around two weeks before the Meinong Earthquake (M_L = 6.4, February 6, 2016) in southern Taiwan. The precursory changes in multi-parameters monitoring may reflect the preparation stage of a large earthquake. And, precursory signals are observed simultaneously that can conduce to expect the approximate location of the impending earthquake with high confidence. The continuous monitoring on the multiple parameters can improve our understanding of the relationship between the observed radon and gamma-ray variations and the regional crustal stress/strain in the area.

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