



Observation and Analysis of Atmospheric Explosions from Seismic Array and its Natural Hazard implications

Bor-Shouh Huang and Win-Gee Huang

Institute of Earth Sciences, Academia Sinica, Taipei, Taiwan (hwbs@earth.sinica.edu.tw)

Dense seismic stations have deployed in Taiwan for seismic activity and hazard reduction purpose. However, different type atmospheric explosions have been recorded by those seismic stations. One of these unknown explosions was heard as large sounds on December 5, 2013. The seismic signals recorded at vertical component is larger than the other two horizontal components. At the same site, the surface seismic signals are clear than signals recorded in deep (downhole station). This explosion has been identified as mysterious explosion in the large northern Taiwan area, previously. Based on array process of dense seismic station signals, we have identified three major seismic signals related to three individual explosions along its trajectory across northern Taiwan from southeastern to north-western direction. One of atmospheric explosions is related a large chemical explosion at the Taipei metropolis on April 22, 2011. This accidental explosion has been well recorded by a broadband seismic array in the northern Taiwan and some strong motion instruments with distances less than several hundred meters. Air compression signals were well recorded by the broadband array and a possible shock wave signal was recorded at the nearest by strong motion station. Based on the seismic observations and offline process, this explosion can be well located. Its magnitude can be determined by nearby strong motion records. Not only seismic stations but also limited infrasound stations were recorded those atmospheric explosions well. Thus, join seismic and infrasound stations, a new type monitoring network can be constructed to monitor atmospheric explosions which may be related to accidental artificial explosion or mysterious explosion. Those events are not well routinely identified but with large social impact and potential natural hazards.