

VHF帯電波見通し外伝播に関連した大気圏、電離圏の現象

茂木 透 [1]; 柿並 義宏 [2]; 森谷 武男 [3]

[1] 北大・地震火山センター; [2] 北大・地震火山; [3] 北大・地震火山センター

Atmospheric and ionospheric phenomena related to VHF-band radio wave propagations beyond the line of sight

Toru Mogi[1]; Yoshihiro Kakinami[2]; Takeo Moriya[3]

[1] ISV, Hokkaido Univ.; [2] Inst. Seismo. Vol., Hokkaido Univ.; [3] Inst. Seis. Volc., Hokkaido Univ.

We have monitored anomalous VHF-band radio wave propagations received beyond the line of sight prior to earthquakes since 2003 in Hokkaido, northern Japan, to confirm the relationship between anomalous propagation of VHF-band radio waves and impending earthquakes. Anomalous VHF-band radio waves were recorded before some medium and large earthquakes of magnitude 4 or higher. Radio waves transmitted from a specific FM radio station are considered to have been scattered in the atmosphere (Fukumoto et al. 2002), allowing the radio waves to be received by an observation site beyond the line of sight of the transmitter station.

One hypothesis to explain the pre-earthquake anomalous radio wave propagation is that radon gas emanates from the surface as a result of increasing fluid pressure during the preparation process of an earthquake (Pulinets and Ouzounov, 2011). The radon release increases the density of small ions and the atmospheric conductivity and decreases the atmospheric electric field in the lower atmosphere (Omori et al. 2009). To confirm the process, we monitored the atmospheric electric field at the VHF radio wave monitoring site. Variations in the atmospheric electric field accompanied by anomalous radio wave propagations were observed at times. Additionally, larger anomalous propagations, may be caused by the sporadic E layer of the ionosphere, are observed in the early summer season. The sporadic E anomalies may overlap anomalies associated with earthquakes and can be distinguished as a distinct feature.