

Experimental Study for Lithosphere-Atmosphere-Ionosphere Coupling : Observation of Atmospheric Parameters at Asahi Station, Chiba, Japan

*Junpei Omura¹, Peng Han², Chie Yoshino¹, Katsumi Hattori¹, Michikuni Shimo³, Toshiharu Konishi⁴, Ryuichi Furuya⁵

1. Graduate School of Science, Chiba University, 2. Institute of Statistical Mathematics, 3. Fujita Health University, 4. OHYO KOKEN KOGYO CO., LTD., 5. COM SYSTEM, INC.

The Ionospheric anomaly is one of the most promising precursory phenomena for large earthquakes. Lithosphere-Atmosphere-Ionosphere Coupling (LAIC) model has been proposed to explain these phenomena. To examine the possibility of chemical channel of LAIC through the monitoring of atmospheric electricity parameters, we have installed sensors for the atmospheric electric field (AEF), atmospheric ion concentration (AIC), radon concentration, radon exhalation quantity (REQ), and weather elements. We will report the properties of variation in atmospheric electricity parameters observed at Asahi station (ASA), Japan to identify earthquake-related signals in these parameters.

We found that the variation of radon exhalation quantity shows a clear negative correlation with 3 hours delay to the air pressure variation in clear days. Each season differs in daily pattern. AIC and AEF variations show lag correlation with radon exhalation quantity variation. To extract anomalous radon variation related to earthquakes, we should set a network of Radon monitoring and establish a model of radon variation for the future detailed analysis. We also observed cases that AEF has showed a spike-like increase at the same time as the time when AIC has largely increased. It must be going to be checked whether AEF data was taken in fair-weather period, however, it is suggested that change in local charge distribution may have influenced AEF.

Keywords: Lithosphere-Atmosphere-Ionosphere Coupling, atmospheric ion concentration, atmospheric electric field, radon exhalation quantity