Rn flux from the ground and Rn flux anomaly possible related to local seismicity at Asahi station, Japan

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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 the chemical channel of LAIC model 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.

On May 17, 2018, an M5.3 earthquake with depth 50 km occurred at 7 km distance from the Asahi station. And, from around June 3, a slow slip event is started at the boundary of Philippine Sea plate and the North America Plate off the Boso Peninsula, where locates 40 km distance from Kiyosumi station. We observed that the ground Rn content increased and the atmospheric electric field decreased with these crustal phenomena. This is the observational fact of the chemical channel of LAIC. In order to check the long-term variation, we analyze data from February 13, 2018 to December 5, 2018 (296 days). To identify signals related to crustal activities such as earthquake and the slow slip event, changes caused by non-tectonic activities should be removed. In this aim, we performed Multi-channel Singular Spectrum Analysis (MSSA) to the observed time series of the radon content and climatic parameters and investigated the correlation. Then we can discriminate radon variation influenced by climatic effects and estimate the Rn flux from the crust. Detailed results will be reported in our presentation.