Characteristics of Atmospheric Parameter Changes at Boso Peninsula, Japan ~Observational Study to Understand Lithosphere-Atmosphere-Ionosphere Coupling ~

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The total electron content (TEC) and the thermal infra-red (TIR) anomalies preceding large earthquakes have been reported and they considered the most promising precursory phenomena. For Ionospheric anomalies preceding earthquakes in Japan, positive or increase anomaly about 1-5 days before earthquakes with M>6 found to be significant for statistical analysis. In addition, effectiveness of forecast is statistically proved. The mechanism of this phenomenon is not well understood. But in order to explain these phenomena, Lithosphere-Atmosphere-Ionosphere Coupling (LAIC) model should be established and several models have been proposed.
Among of them, there is a geo-chemical channel. This model is based on changes of the electric field caused by Rn emanation due to stress change under the ground. To examine the possibility of the chemical channel of LAIC through the practical monitoring of atmospheric electricity parameters, we have installed sensors of the atmospheric electric field (AEF), atmospheric ion concentration (AIC), atmospheric radon concentration (ARC), radon exhalation quantity (REQ), and weather elements. In order to discriminate signals related to earthquakes, possible variations caused by non-tectonic activities should be removed. In this paper, we investigate the properties of variation in atmospheric electricity parameters (precipitation disturbance (AIC, AEF), seasonal diurnal variation (AIC, AEF, REQ), correlation with atmospheric pressure (REQ), and correlation between atmospheric electricity parameters) observed at Asahi station (ASA) and Kiyosumi station (KYS), Japan to understand the characteristics of their variations. The results suggest that radon emanation from the ground could modify the variations of AIC and AEF. However, site effects based on environmental factors such as geological setting, geography, vegetation, and so on should be taken in account properly.

In addition, to discriminate signals related to earthquakes, possible variations caused by non-tectonic activities should be removed. In this aim, we have performed the Singular Spectrum Analysis (SSA) for the observed time series of radon and climatic parameters for ASA data. And we investigated the correlation among them. Then we tried to extract radon variation based climatic effect to remove such normal variations from the original time series. Then we identify

the abnormal changes possibly related to the flux change of Rn gas due to stress change including local seismic activity. The details will be shown in presentation.

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