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Multi-channel singular spectrum analysis of underground Rn concentration at Asahi station, Japan: Preliminary report on the variation of underground Rn flux

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There are many reports on electromagnetic pre-earthquake phenomena such as geomagnetic, ionospheric, and atmospheric anomalous changes. Ionospheric anomaly preceding large earthquakes is one of the most promising phenomena. Lithosphere-Atmosphere-Ionosphere Coupling (LAIC) model has been proposed to explain these phenomena. In this study, to evaluate the possibility of chemical channel of LAIC by observation, we have installed sensors for atmospheric electric field, atmospheric ion concentration, atmospheric Rn concentration, underground Rn concentration (GRC), and weather elements at Asahi station, Boso, Japan. Since the atmospheric electricity parameters are very much influenced by weather factors, it is necessary to remove these effects as much as possible. In this aim, we apply the MSSA (Multi-channel Singular Spectral Analysis) to remove these influences from the variation of GRC and estimate the underground Rn flux (GRF). We investigated the correlations (1) between GRF and precipitation and (2) between GRF and the local seismic activity around Asahi station. The preliminary results show that there is a tendency of correlation (1) between GRF and heavy rain and (2) between GRF and local seismicity within an epicenter distance of 50 km from the station.