



Geoelectric response on the ground surface due to inhomogeneity of electric structure

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Numerous reports supported the existence of geoelectric changes prior to earthquakes. However, there are some active debates on the study on seismic electric signals (SES), mainly including the physical generation mechanism and the selectivity phenomenon of SES. In this study, we focus on the SES selectivity.

As the possible explanation of the SES selectivity phenomenon, some laboratory analog experiments based on a geographical scaling model and a waveguide model were developed, showing experimental evidence of the SES selectivity due to the geographical effect such as the distribution of ocean and land. Some numerical simulations indicated that the SES selectivity could be caused by possible underground conductive channel. Thus, in order to understand the SES selectivity phenomenon, it would be important to investigate the detailed geoelectric response on the ground surface due to an inhomogeneous electric structure.

We combine the above analogue experimental and numerical approaches in our study on the SES selectivity and make detailed investigation on the geoelectric response on the ground surface due to an inhomogeneous electric structure. We also investigate the possible frequency response due to the underground conductive channel. The preliminary results indicated that the amplification effect of an underground conductive channel, which has been adopted as a possible explanation of the SES selectivity phenomenon, can be expected only at a much lower frequency. The double contribution of the resistivity inhomogeneity on the ground surface and the underground conductive channel could play an important role in the SES selectivity phenomenon.

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