Stress-induced charges in gabbro at high temperature

*Chihiro Yamanaka¹, Daiki Maezono¹

1. Graduate School of Science, Osaka University

Preseismic ionospheric disturbance just before large earthquakes was found at the 2011 off the Pacific coast of Tohoku Earthquake (Heki,2011). Similar phenomena up to 18 cases (Heki's TEC anomaly) were found in earthquakes of M 7-9 since 1994. It should be noted all the earthquakes larger than M 8.5 during that duration were 5 times and Heki's TEC anomaly was observed for all of them. Assuming the phenomena were drived by surface electromagnetic field due to stress induced charges distributed thinly around focal or nucleation zone, we have been studying stress-induced charges from silicate rocks. A dried gabbro sample (10×10×3 cm) was heated up to 350°C, then stress-induced current under uniaxial stress of 10 MPa was observed with the variation of temperature.

Experimental results showed that stress-induced charges increased from room temperature to 200°C but then decreased at higher temperature. We would like to discuss the mechanism of Heki's TEC anomaly based on the experimental results and computer simulation.

[1] K. Heki (2011), Geophys. Res. Lett. 38, L17312.

- [2] L. He and K. Heki (2017), J. Geophys. Res. Space Phys., 122, 8659-8678.
- [3] K. Heki and Y. Enomoto (2015), J. Geophys. Res. Space Phys., 120, 7006-7020.
- [4] L. He and K. Heki (2017), J. Geophys. Res. Space Phys., 123, 4015-4025.

Keywords: Ionosphere disturbance, Heki's TEC anomaly, stress induced charges