

## 新島・神津島における平成23年東北地方太平洋沖地震後の地電場スペクトル変化

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## Spectra changes in geoelectric fields in Nijjima and Kozushima Islands after the 2011 off the Pacific Coast of Tohoku Earthquake

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The 2011 off the Pacific Coast of Tohoku Earthquake ( $M_w=9.0$ , hereafter Tohoku EQ) occurred at 14:46 on March 11, 2011 JST. Just after that, several felt earthquakes and many unfelt earthquakes ( $M=1.0-4.7$ ) occurred approximately 3-11 km beneath a strait between Nijjima, Shikinejima, and Kozushima Islands approximately 500 km southwest from the epicenter of Tohoku EQ. Most of the felt earthquakes occurred by evening March 11, 2011 JST. The activity of unfelt earthquakes continued to March 15, 2011 JST and then rose up again in a farther local region on March 22, 2011 JST. If Tohoku EQ triggered these earthquakes, the seismic shock from Tohoku EQ would change the physical and chemical states in the focal zone beneath the strait. Here, we checked the geoelectric state in Nijjima and Kozushima islands by use of our observation data (1 sec sampling) of the geoelectric fields in these islands. We assumed that, for short periods (say,  $\leq 10$  min), the geoelectric fields in these islands were induced mainly by the geomagnetic fields. However, because we do not observe the geomagnetic fields in these islands, as the first try, we used the pseudo geomagnetic fields obtained from the linear combination of the geomagnetic fields at Memambetsu, Kanoya, and Chichijima sites in Japan. The FFT spectra were calculated for the data set of 512 sec with the interval of 88 sec (the running window of 10 min) for all of the data. We made multi regressions analyses between the time series FFT spectra of the geoelectric fields using those of the pseudo geomagnetic fields with impedance tensors for the data during March 1-10, 2011 JST and determined the conversion functions for each period. Using the functions, we calculated the time series FFT spectra of the geoelectric fields for the whole period of the March and made the residuals between the original and calculated spectra. The residuals, especially of the real part at the 512 sec period in Nijjima Island, disturbed just after the occurrence of Tohoku EQ. They continued even after the local felt earthquake events and then calmed almost down by March 13, 2011 JST. Disturbances were not so clear in shorter period FFT spectra. However, generally in this study, shorter the period of the time series FFT spectra was, lower the coefficient of determination for the conversion function was. Therefore, small disturbances may just be buried in the fitting residuals. If this disturbance was the case, it meant a change in the impedance tensor. The first half of the changes (during the felt earthquake events) would be partially pseudo because of the streaming potential changes and/or the electrode's contact resistivity changes during quaking. The later ones (during the unfelt earthquake events) would be because of, for example, the state changes of porosity and underground water in the islands area rather than because of quaking. Finally, we thank JMA for the data of the geomagnetic fields at three sites.