地震波による電場変化のタイプと電場生成メカニズム

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Various types of electric field variations associated with seismic waves and electric-field generation mechanisms

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We have so far reported many examples of electric field variations in association with earthquakes and also with artificial blasting. One clear type is a circular polarization of electric field, as was first found for aftershocks of the earthquake of magnitude 6.9 (JMA) which occurred on March 25, 2007 off the coast of the Noto Peninsula. Such a circular polarization could be well interpreted in terms of resonance of ions motion in the groundwater with the seismic wave. Recently we have also found a similar example with elliptical polarization of electric field for an M5.2 earthquake which occurred 2 days after the June 14, 2008, Iwate-Miyagi Inland earthquake of magnitude 7.2. This example will be explained in more detail in our poster. Another clear type is a linear polarization, which was recently found through the revisit to seismic and MT data obtained during artificial blasting in the Nagano Prefecture on October 30, 2002. In this case, almost identical NS and EW components of electric field were found. This result cannot be explained in terms of the seismic dynamo effect only and another mechanism such as streaming potential seems to be superposed. In the case of a similar experiment for blasting made on October 13, 2006 in the north of Asama Volcano, a different behavior was found. There is one more example of experiment associated with blasting, although analyses are not yet completed. Also we have two other examples associated with earthquakes: one for the M7.1 off-Miyagi-Prefecture earthquake of May 26, 2003 and the other for the M6.8 Niigata-Chuetsu earthquake of October 23, 2004. In these two cases, however, the data quality does not seem to be good enough to examine detailed behavior of electric field variation associated with seismic waves. In any case, these examples will enable us to a unified understanding of electric field variations associated with seismic waves.