地球電磁場加速度の時空間分布とマントル最下部電気伝導度
Geoelectromagnetic jerks produced by heterogeneous electrical conductivity in the D" layer

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Geomagnetic jerks are identified at 2003, 2007 and 2011 in the Atlantic and Indian Ocean. It has been suggested by Chulliat et al. (2015) that the regional nature of the geomagnetic jerks and spatio-temporal variations of geomagnetic secular acceleration can be explained by fast equatorial magnetohydrodynamic waves propagating near the surface of the Earth's core. On the other hand, the geoelectric field observed using long baseline submarine cables in the northwestern Pacific also showed sudden change of its secular variation at 2006. In a previous study, we showed using a simplified mantle conductivity models that the geoelectric field variation and the geomagnetic jerk in 2007 can have the same origin; the variations can be generated by a sudden change of the toroidal magnetic field secular variation in the core and influence of high electrical conductivity region in the D" layer beneath the area where the geomagnetic field variation was evident. Since the geoelectric and geomagnetic field variations can have the same origin, we call the variations a geoelectromagnetic jerk. In this presentation, we show results of numerical experiment on the electromagnetic field in the mantle due to the toroidal magnetic field variation in the core employing more realistic distribution of the electrical conductivity in the D" layer based on the SH-wave velocity model obtained by Takeuchi (2012). Conductivity heterogeneity at the Earth's surface due to the conductivity contrast between the land and seawater on the electric field is also included in the numerical experiment to examine its effect on the voltages observed by submarine cables. Typical spatio-temporal variations of the observed and simulated geoelectromagnetic field are examined to consider plausibility of geoelectromagnetic jerk hypothesis.
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Takeuchi, N. (2012) Detection of ridge-like structures in the Pacific Large Low-Shear-Velocity Province, Earth and Planet. Sci. Lett., 319-320, 55-64.

