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道東地域の地磁気永年変化
Geomagnetic secular changes in eastern Hokkaido

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1. Introduction Localized geomagnetic secular changes have been reported in the eastern Hokkaido, previously by repeat surveys, and more recently, by continuous recording (e.g., Oshima et al., 1994; Nishida et al., 2004; Hashimoto et al., 2010). In relation to a strong magnetic anomaly and along the southern coast of this area, Nishida et al. (2004) discussed the piezo-magnetic field due to stress accumulation by plate subduction. To elucidate the nature of such 'anomalous' secular changes in the total field, we started geomagnetic three-component absolute measurements.

2. Evaluation of the orientation effect Firstly, we evaluated the so-called orientation effect in the simple differential total field, which arises from the locality of magnetic inclination and declination at each station. The reference station that both we and previous studies used for the simple differential total field is Memambetsu magnetic observatory of Japan Meteorological Agency (MMB), which is 50 to 100 km away from our stations. Our absolute measurements revealed that the magnetic orientations at some stations were considerably (1 to 2 degrees) deviated from the one at MMB, and thus, this effect should not be neglected in discussion of long-term changes.

3. Effect of global-scale changes While correcting the orientation effect, we assessed an effect of global-scale secular changes by using the IGRF-11 model. We calculated secular changes in the total field at our stations and MMB from the IGRF model. Significant secular trend was found to remain in the differential field. As a result, considerable part of the observed field can be explained by this component. So the global change seems to contribute much to regional-scale secular changes in eastern Hokkaido. Deviated fields from the global-related secular term showed better agreement with the predicted piezo-magnetic field which was previously proposed by Nishida et al. (2004). However, it is still uncertain that the residual field is significant or not, as well as its origin. A mega-earthquake which will take place at the plate boundary in this region may be an opportunity to examine directly whether the deviated secular changes are of pezo-magnetic origin or not.

References

Hashimoto, T., T. Mogi, M. Nishimura, S. Arita, Absolute magnetic measurements in the eastern Hokkaido, *Conductivity Anomaly Resea* 56-63, 2010 (*in Japanese*).

International Association of Geomagnetism and Aeronomy Working Group V-MOD, 2010. International Geomagnetic Reference Field: the eleventh generation, *Geophys. J. Int.*, **183**, 1216-1230.

Nishida, Y., Y. Sugisaki, K. Takahashi, M. Utsugi, and H. Oshima, 2004. Tectonomagnetic study in the eastern part of Hokkaido, NE Japan: Discrepancy between observed and calculated results, *Earth Planets Space*, **56**, 1049-1058.

Oshima, H., T. Maekawa, M. Utsugi, Y. Nishida, Repeated Survey of Gravity and Geomagnetic Total Force Intensity in the Eastern Part of Hokkaido after the Kushiro-Oki Earthquake of January 15, 1993, *Geophysical bulletin of Hokkaido University*, **57**, 23-33, 1994.

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