

A study on the phase shift of Sq field around Japan Arc(III)

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1. Introduction

It is well known that the vertical phase of Sq field around Kanto district progresses relatively in Japan. It is believed that the shift be attributed to the earth's electrical conductivity distribution in depths of several hundreds km. We, however, have reanalyzed the geomagnetic data in 1997, when the geomagnetic activities were most calm in recent years, and found that the relative phase progress has seasonal changes. Then we carried out a spherical harmonic analysis to confirm whether the external field caused the apparent phase shift in Kanto district by using world wide geomagnetic data. But external field has not explained it, yet. We show more detailed spherical harmonic analysis in this presentation.

2. New data set and processing

The observation sites of world data center (WDC) in 1997, whose geomagnetic data are available, distributes highly non-uniformly. Therefore we demonstrated not only calculating model resolution matrix but carrying out the spherical harmonic analysis to synthetic data that is composed of an ideal external Sq field and the internal induced field. Moreover, we tried to utilize satellite data.

In this processing, we subtracted annual average field in nighttime from raw data to eliminate the earth's main field and crust-originated field.

3. The resolution of internal and external field separation around Japan was not enough

The resolution matrix for model parameters and the inversion using synthetic data showed that the spherical harmonic analysis did not resolve small-scale field, enough. To overcome this difficulty, we are now wrestling with a spherical cap harmonic analysis. We plan to present the results of spherical cap harmonic analysis, too.