About the phase shift of vertical component of Sq field in the Central Japan

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Rikitake et al.(1956) analyzed magnetic variation in Japan during a geomagnetically quiet period between 1952 and 1955, and pointed out that there is a phase progress in the vertical component of Sq field at Kakioka Magnetic Observatory (KAK) relative to those at other observatories. From this observation, they proposed a qualitative model in which the phase shift can be attributed to anomalous distribution of the mantle electrical conductivity. However three-dimensional (3-D) numerical modeling has been realized, and Kuvshinov et al.(1999) showed that this phase shift of Sq field variations at KAK can be explained by the induction in the oceans, where Schmucker's (1985) 1-D conductivity model was used as the background. On the other hand, we analyzed the Sq field variations by the different data processing. Using hourly values of 3 components of magnetic field in 1964 and 65, the transfer functions of each component of magnetic field at each observation site were calculated to a reference site. First, we reexamined the phase responses of transfer function for KAK and other observation sites in Japan. Irkutsk observatory in Russia was chosen as a reference site. At period of 24 hours, the phase response of vertical component at KAK tends to progress indeed and that of Memambetsu observatory also indicates the same tendency. These results consist with the study of Kuvshinov et al.(1999). However that of Kanoya observatory in Japan seems not to be anomalous behaviour, although it locates close to a coast. With regard to influence the tides, we calculated power spectrum density. The total amplitude of P1, S1 and K1 is dominant relative to the amplitude of M1 and O1 for the vertical component at KAK.