GEOMAGNETIC INDUCTION BY Sq ALONG THE 210^0 MAGNETIC MERIDIAN

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Geomagnetic Sq data were utilized to understand the role of oceans and the complex subsurface tectonic settings on the electromagnetic (EM) response at upper mantle depths. The data corresponding to the solar-quiet year, 1996 were used for the present work. The objective of this study is to model the derived long-period EM induction response by developing a 3-D induction model simulator. The observed field variations of each season were then separated into external and internal parts, using Spherical Harmonic Analysis (SHA) technique. The equivalent ionospheric source current systems for all the seasons are clearly identified and that they show a clear pattern of expected seasonal behavior for both the hemispheres.

Geomagnetic Sq variations data were utilized to understand the role of oceans and the complex subsurface tectonic settings on the electromagnetic (EM) response at upper mantle depths. The data from the ground-based permanent and temporary magnetic observatories, situated along the 210^0 magnetic meridian, covering both the hemispheres, corresponding to the solar-quiet year, 1996 were used for the present work. The objective of this study is to model accurately, the derived long-period EM induction response by developing a 3-D induction model simulator. Towards this goal, a season-wise analysis was done by first grouping the data into Lloyd's seasons. The observed field variations of each season were then separated into external and internal parts, using Spherical Harmonic Analysis (SHA) technique. The SHA coefficients were determined upto and including the degree (n=) 12 and order (m=) 4. It is suspected that in addition to the expected ocean effect, the observed internal field is further contaminated by the complex tectonic settings in the chosen area, particularly in the Japanese and Australian regions - the classic cases of continent-ocean collision zones. Therefore, after treating the data to remove the ocean effect, the EM response was recomputed by directly using the SHA coefficients, for the n-m=1 harmonic terms, as only these principal terms contribute to the inducing Sq field. The results are discussed in the light of a derived regional conductivity-depth profile and its interpretation. The results of the on-going simulation calculations will be presented in a future paper. The equivalent ionospheric source current systems for all the seasons are clearly identified and that they show a clear pattern of their expected seasonal behaviour for both the hemispheres. The amplitudes of the external currents appear to be smaller in this East-Asian sector, than that of their other regional counterparts.