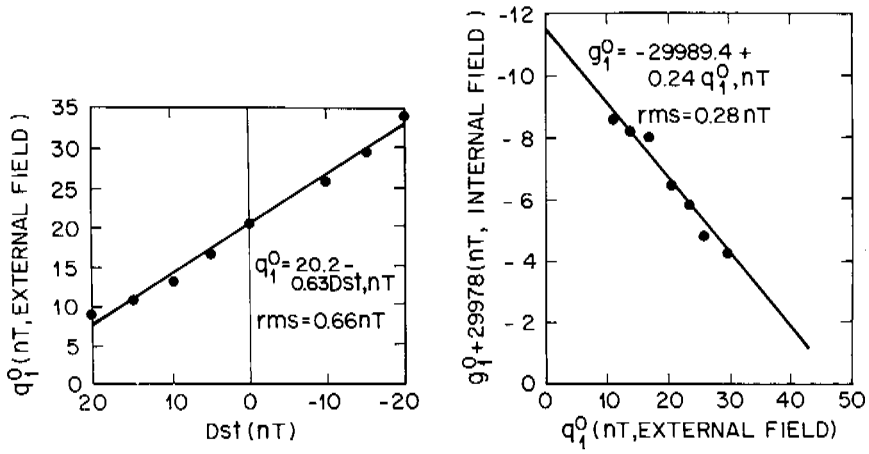
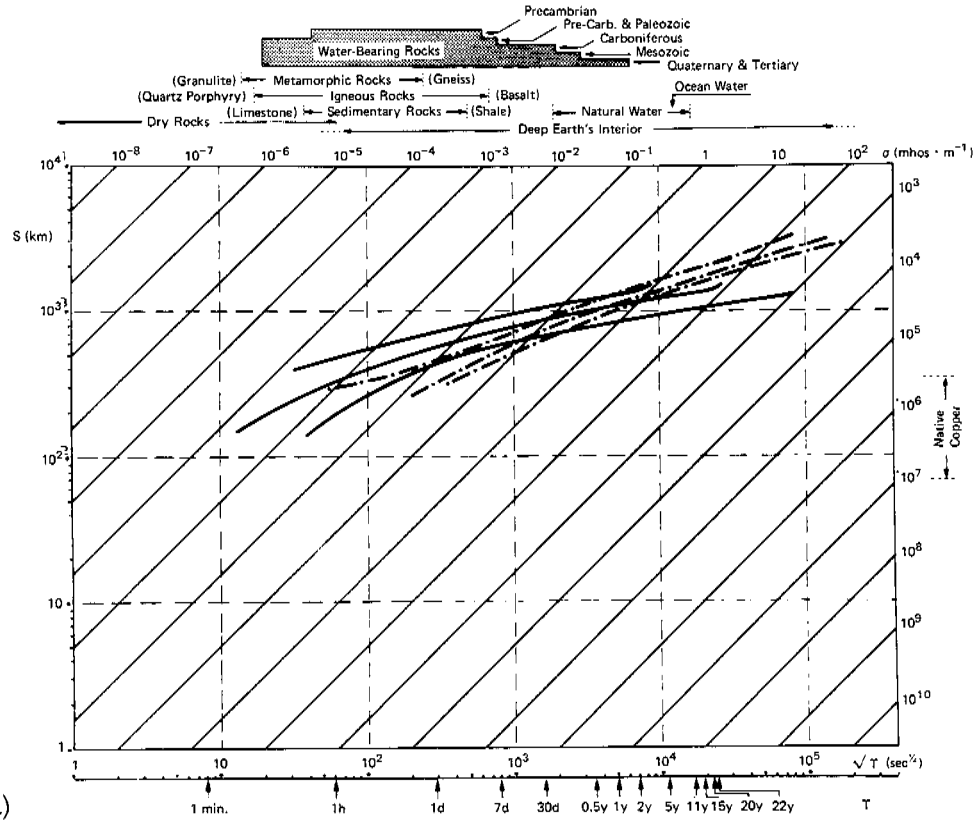


FIGURE 16.3 (a) The spherical harmonic coefficient of lowest degree and order describing the magnetic field originating external to the Earth, as a function of the global Dst index used to describe temporal variations of the equatorial horizontal magnetic field relative to magnetically quiet days. (b) The spherical harmonic coefficient of lowest degree and order describing the field originating within the Earth as a function of the lowest degree and order magnetic-field coefficient describing the magnetic field originating external to the Earth (adapted from Langel, 1982).

occurs, there is an upward warping of isothermal surfaces. In such a case, telluric currents of a given period will flow in shallower layers. A worldwide mapping of the geothermal flux averaged over a 5° × 5° mesh (Figure 16.6) has been provided by Chapman and Pollack (1975). (This map has largely been obtained using about 5000 direct borehole measurements and, where unavoidable, indirect information. For example, since the heat flow from the ocean floor is a well-defined function of the floor's age, the flow can be approximated even when it has not been directly measured. Analogously, a different function relates the continental heat flow to age.)

Three additional aspects of the conductivity structure of the Earth affect the flow of telluric currents—spatial gradients, temporal variations, and channeling.

The spatial gradients of telluric currents strongly depend, in shallow layers, on geochemical composition,



(a)